HELSINKI UNIVERSITY OF TECHNOLOGY

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ACQUISITION STRATEGIES IN A HYPERCOMPETITIVE INDUSTRY

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ABSTRACT OF THE MASTER´S THESIS

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Mergers and acquisitions (M&A) are a common way for companies to grow their market share and diversify into new areas. There have been a lot of studies on M&A performance that show that many acquisitions fail to create any value for the acquirer. Also, these studies have usually focused only on single acquisitions, although many companies in fact do follow consistent acquisition strategies.

This study looks at the existence and performance of acquisition strategies in a hypercompetitive industry. Hypercompetition is characterized by low entry-barriers, rapid technological change and the lack of sustainable competitive advantages. In such an environment companies must constantly look for new resources, e.g. by acquisitions.

The dataset consists of 1456 software firms and 3171 acquisitions they made during the time period 1970-2006. The analysis included both survival analysis utilizing Cox-regression on panel data and OLS-regression to analyze the effect of acquisitions on profit as measured by EBIT.

The results show that acquisitions from same segment and other segments in the same industry have a negative effect on the survival of the acquiring firm. Acquisitions from same segment, other segments and other industries do increase profit of the acquirer. However, expanding into new segments was less beneficial for profits and expanding at a high rate was damaging for both survival and profit. The results suggest that acquisitions are dangerous but they can be used to create positions of dominance that improve survival prospects in the long-term.

Keywords: acquisition, acquisition strategy, hypercompetition, merger	Publishing language: English

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Yritysostot ja fuusiot ovat usein käytetty menetelmä yritysten pyrkiessä kasvattamaan markkinaosuuttaan ja luomaan uutta liiketoimintaa. Yritysostojen tuloksellisuutta on tutkittu laajasti, ja monet tutkimukset osoittavat, että suuri osa yrityskaupoista ei luo arvoa ostajalle. Suurin osa tutkimuksesta on kuitenkin keskittynyt yksittäisiin ostoihin, vaikka monet yritykset itse asiassa toteuttavat johdonmukaisia osto-ohjelmia.

Tämä työ tutkii yritysostostrategioiden olemassaoloa ja tuloksellisuutta hyperkilpaillulla toiminnalla. Hyperkilpailun tunnusmerkkejä ovat matalat osallistumisen esteet, ripeä teknologian kehittymien sekä kestävän kilpailuedun puute. Nämä tekijät ajavat yritykset hankkimaan jatkuvasti uusia resursseja, esimerkiksi yritysostoilla.

Tutkimuksen otos koostuu 1456 ohjelmistoalan yrityksestä sekä näiden suorittamista 3171 yritysostosta vuosina 1970 - 2006. Tutkimuksessa hyödynnettiin sekä Cox-regressiota käyttäen selviytymistä selitettävänä muuttujana että pienimmän neliösumman regressiota, jossa selitettävänä muuttujana oli taloudellista tilannetta kuvaava liikevoitto.

Tutkimuksen tulokset osoittavat, että yritysostot samasta segmentistä samoin kuin saman toimialan eri segmenteistä ovat haitallisia yrityksen selviytymiselle. Yritysostot samasta segmentistä, toisista segmenteistä ja toiselta teollisuudenalalta lisäävät kuitenkin yrityksen voittoa. Laajentuminen uusille segmenteille vähensi näin luotua voittoa. Lisäksi nopea laajenemistahti heikensi sekä voittoa että selviytymistä. Yritysostot ovat vaarallisia yrityksille, mutta niitä voidaan käyttää toiminnan laajentamiseen, mikä parantaa yrityksen selviytymismahdollisuuksia.

Asiasanat: fuusio, hyperkilpailu, yrityskauppa, yritysosto, yritysostostrategia	Julkaisukieli: Englanti

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1 Introduction

1.1 Background

Acquisitions, different approaches to them, and their respective benefits to firms have been a subject of intense research interest. Most of these studies have tended to look only at individual acquisitions and some have even excluded companies that made several acquisitions during the research period (Laamanen & Keil, 2008). Still several large companies such as Microsoft and Cisco engaged in more than 50 acquisitions during the 1990s and there is no reason to expect such behavior to have disappeared or to be about to disappear. Such serial acquirers often exhibit a clear and consistent acquisition strategy that is an important part of the corporate strategy and defines what kind of targets the company is seeking (Hopkins, 1987b). The strategy or the acquisition program also define the rate of acquisition the company is seeking (Laamanen & Keil, 2008). Companies with consistent acquisition strategies have been shown to perform better in the long-term than their competitors (Hopkins, 1987b; Laamanen & Keil, 2008).

This study looks at acquisition strategies in a hypercompetitive industry. Such an industry is characterized by competitive advantages that, instead of being sustainable, are often short-lived as competitive activity on firm-level disrupts the linkages between conduct and performance (D'Aveni, 1994). So the firms in such an industry must take continuously new actions in order to sustain their competitiveness (Young *et al.*, 1996).

Although the thesis concerning the prevalence of hypercompetition and the trend towards hypercompetitive industries is criticized (McNamara *et al.*, 2003; Wiggins & Ruefli, 2005) it is accepted that such industries do exist and the characteristics of hypercompetition are most evident in high-tech industries with low entry barriers (Gimeno & Woo, 1996; Wiggins & Ruefli, 2005). This study focuses on one of such industries, namely the software industry. The reason for

focusing on only one industry is that software industry offers a sufficiently large data set of companies and acquisitions and because different industries may have different acquisition performance factors as suggested by Salo (2006)

The aim of this study is to identify those acquisition strategies that give the best results in terms of survival and financial performance to companies in an industry where sustainable competitive advantages may be difficult to create and maintain. The study looks at how different types of acquisitions affect both performance and survival and how these effects differ depending on the financial health of the acquirer.

1.2 Research question and objectives

The research question of this study can be formulated as following:

What kinds of acquisition strategies work best in a hypercompetitive industry?

This can be divided into the following sub questions:

What kind of acquisition strategies can be identified in a hypercompetitive industry?

How do the results of these strategies differ on both survival and financial performance?

These research questions are further developed into hypotheses in the third section and their answers are provided in the two last chapters.

1.3 Research methods

The theoretical background of this study is based on a literature review of both acquisition strategies and their performance and hypercompetitive industries. Additional streams of research are the complexity theory that allows the modeling of industry as a fitness landscape of different segments with various fitness values and research into intra-industry diversification that is an important motivation for acquisitions in the software industry. The material for the literature review was

mainly identified based on ISI Web of Science and Google Scholar search engines and expert inputs.

The empirical part of the work consists of hypothesis constructing and then testing these hypotheses on a data set of 1400 software companies and their acquisitions in the period 1970-2006. The hypotheses are tested using both Cox regression on survival analysis and OLS regression on the financial effects of acquisitions.

1.4 Structure

The study consists of six sections the first being the introduction. In the second section I will describe the ongoing and past research of acquisitions and their motives in order to identify existing categorizations of acquisition strategies. I will also review existing literature on hypercompetition and evolutionary perspective in general and software industry in particular.

Based on thorough understanding of the literature I will formulate on my hypotheses concerning both intra- and inter-segment acquisition strategies that will increase survival rates in software industry. These hypotheses are presented on the third section of this study.

The fourth section describes the data on which the empirical data used in this study and the methods and analyses used. The result of these analyses concerning both individual acquisitions and acquisition strategies are presented on the fifth section.

The two last sections include both the conclusion of my results and its implications for managers and researchers as well as the discussion about the possible causes of the observed results.

2 Theoretical background

In order to formulate my hypotheses I will review the discussion on the major subjects of my research: acquisitions and acquisition strategies, sources of competitive advantage and hypercompetition. When identifying acquisition strategies I as well review the literature on complexity theory as in that field there are ideas concerning search processes of organizations (Gavetti & Levinthal, 2000) that can be applied to acquisitions strategies as well. As most of the studies on acquisition strategies focus on inter-industry diversification and the focus of this study is intra-industry diversification, I also review shortly the discussion about the differences between diversification inside an industry and across industry boundaries and how these affect the study.

The section also includes a review of the industry dynamics of software industry to prove that the industry is indeed characterized by hypercompetition and thus theories about sources of competitive advantage can be applied to it. In this section I also try to identify the major ideas of research in order to formulate my research hypotheses concerning the acquisition strategies of a hypercompetitive industry. The process is shown in Figure 1.
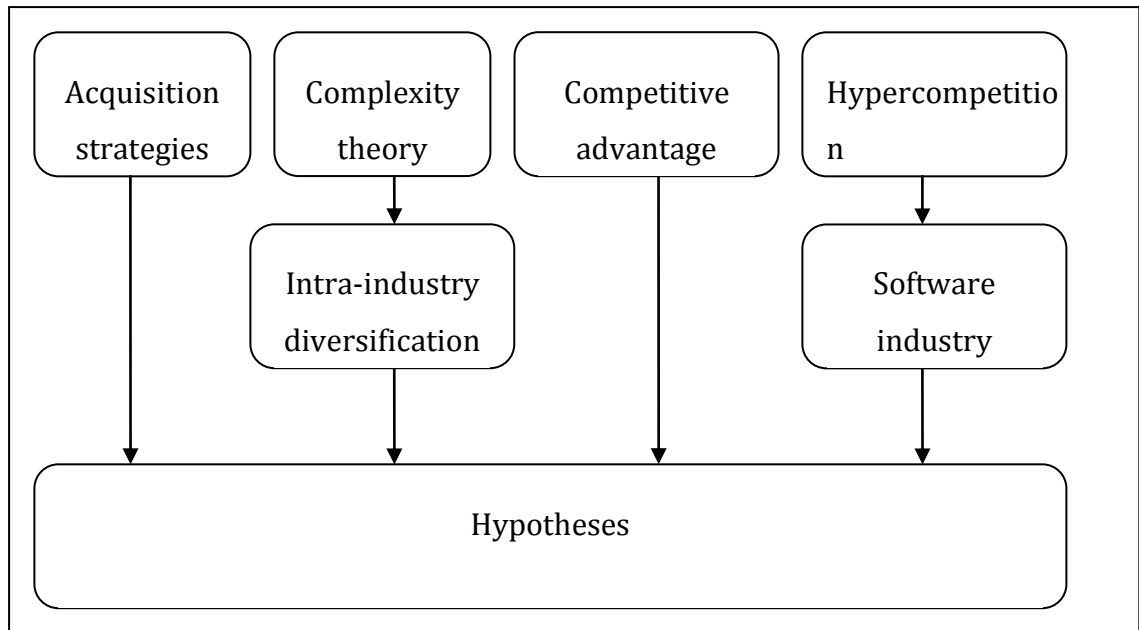
Figure 1: Structure of the chapter

2.1 Competitive advantage vs. dynamic resources

There exist conflicting theories as to what is the essence of a firm and how can its success factors be explained and predicted. Porter's (1980) five forces model determines the success of a firm in relation to five outside influences. The model is the best known description of the so called structure-conduct-performance paradigm of industrial organization. The paradigm predicts that the performance of an industry is defined by the conduct of its suppliers and buyers and these again are a function of the industry structure (Bain, 1959; Mason, 1939). Although the paradigm was originally applied in industrial organization, it has since made a successful leap to the field of strategic management (McWilliams & Smart, 1993). The model is presented in Figure 2.
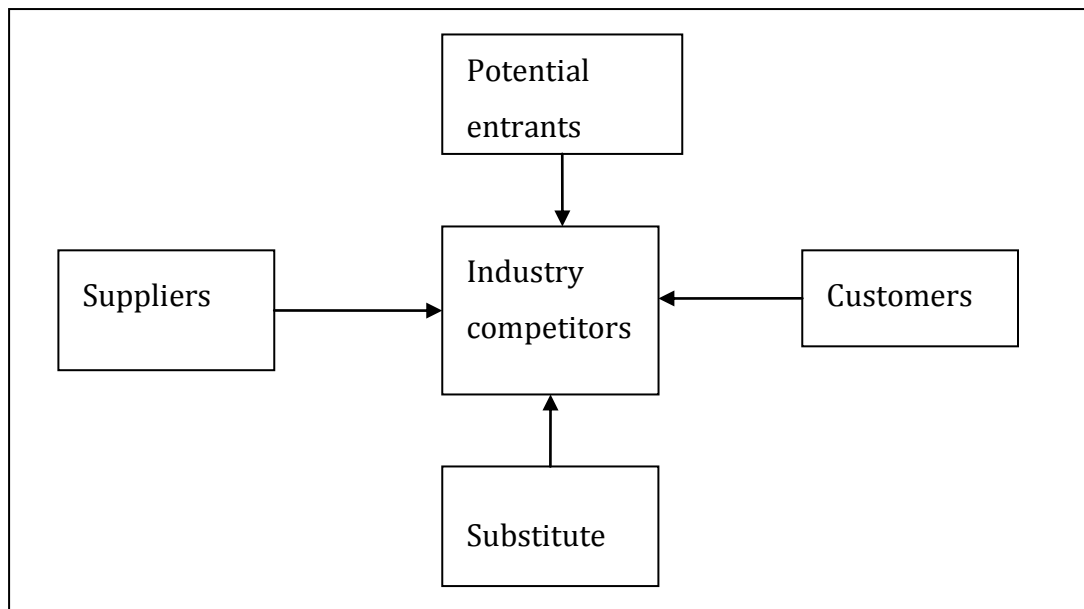
Figure 2: Five-forces model of competition

In Porter's model the firm erects entry barriers in order to protect its competitive advantages. Competitive advantage is simply defined as "when a firm creates more economic value than its rivals" (Barney, 2007). These competitive advantages enable the company to generate rents or profit above the risk-weighted cost of capital.

The model has been criticized for presenting competition as a static equilibrium with little endogenous change (Thomas, 1996). Scientific innovations, capital markets and government interventions are all left out of the model, although Porter (1980) describes them as well in his seminal book on the subject.

In the resource-based view as presented by Penrose (1959) and Barney (1991) firm is seen as a bundle of resources that is more or less unique. These resources represent those tangible or intangible assets that are tied semipermanently to the firm (Caves, 1980). Sustainable competitive advantage is created by resources that should create value for the company, be rare and hard to imitate and also have little if any substitutes (Barney 1991). Value creation

happens by operating such a bundle in an industry where the competitors can not match the offering.

As the resources are not interchangeable and tend to appear in lumps it often happens that a firm has a surplus of one resource to what is needed for its current production. When faced with this kind of excess in e.g. managerial skills, the firm has an internal incentive to diversify in order to utilize fully the existing resource base (Penrose, 1959).

Both of these theories offer compelling rationales why acquisitions exist and why they might be beneficial for the acquirer. Porter (1980) suggests acquisitions as a method of entering new businesses but notes that the acquirer is likely to benefit only in cases of imperfect markets. When efficient markets exist, the acquisition price is likely to reflect earnings opportunities and thus no abnormal profit can be racked up. Also acquisitions that bring in market share in existing businesses and thus help to improve operations can be useful.

When firms are seen as unique bundles of resources, acquisitions are most useful when they can either bring in some needed resources or an oversupply of existing resources can be utilized in new business (Penrose, 1959). Even in these cases acquisitions are most likely to succeed when they are done in a gradual manner (Wernerfelt, 1984).

2.2 Acquisitions and their motives

Whereas theories of competitive advantage look at acquisitions as only one of the possible means to an end that is the improved competitive position, there exist a whole research stream dedicated to acquisitions and what drives firms to undertake them. As the value of mergers and acquisitions has increased during the last two decades (Schoenberg, 2003) so has the volume of this stream. This research has produced many taxonomies of acquisitions and also of the motives that companies have in undertaking them. As these categorizations are related to

the context of the acquisitions and the possible methods of value creation (Swaminathan *et al.*, 2008) they are also important in understanding the discussion about acquisition strategies.

In his article about the motives for acquisitions Trautwein (1990) presents seven different theories that are most prominently used in explaining acquisitions. Four of these assume wealth is created or at least transferred to the acquiring company's shareholders. These are efficiency theory, raider theory, monopoly theory and valuation theory. They also see acquisitions as a planned, rational choice. Empire-building theory assumes that mergers are mostly taken to satisfy managers' ambitions and all benefits accrue to them. However, the choice is still rational unlike in the last two theories: process theory and disturbance theory. Former implies that merger is an outcome of strategy as an emerging process as presented by the learning school (Mintzberg, 1990). The latter theory takes mergers as symptoms of an economy wide process in which economic disturbances cause disturbances in asset valuations.

Of the motives suggested by Trautwein only the efficiency theory takes into account the existence of the two firms as little else as platforms from which the managers can launch their attacks on unsuspecting targets. The resource-based view of the firm as presented by Barney (1991) and Wernerfelt (1984) gives much more weight to the existing assets and resources of the firm. The resource-based view of a firm actually suggests a motive for acquisitions as firms may thus be able to build new resource-bundles that could not be traded on the market (Wernerfelt, 1984). Matsusaka (2001) suggest that acquisitions may also be a way of utilizing managerial skills and abilities in a declining industry. This would be close to the efficiency theory but with little respect to the business of the original firm as the skills can be deployed broadly across industry.

There also exist financial motives for acquisitions other than taking advantage of incorrect valuation or lowering the cost of capital that are suggested

by Trautwein (1990). Firms may engage in acquisitions in order to diversify the firm's portfolio and in this way reduce volatility of the cash flow. In a similar vein they may try to reduce the risk of bankruptcy by diversifying revenue streams and in effect insuring themselves with acquisitions (Anand & Singh, 1997).

The different motives for acquisition presented above also differ in how likely they are to lead into consistent acquisition strategy. Acquisitions driven by motives of efficiency and monopoly would lead to a strategy of consolidation within the industry or business segment. Matsusaka's (2001) view of acquisitions as a method of utilizing skills that are underused in a declining business would suggest an acquisition strategy based on diversification and unrelated acquisitions.

2.3 Acquisition strategies

Research into acquisition motives is usually concerned with individual acquisitions only. The focus of this study, however, is the effect that acquisitions have over a time frame of several years on the focal firm's performance. Existing research of acquisition strategies has often been focused on industrial companies but if offers important guidelines as to what sort of strategies might be used in the software industry.

In looking at different acquisitions it is important to classify them by some objective measure. A common division is whether the acquisition represents unrelated or related diversification (Hopkins, 1987b; Montgomery & Wilson, 1986). This stems from the fact that many earlier studies relied on data provided by the FTC that divided acquisitions into horizontal, vertical, product-extension, market-extension or unrelated. The first four categories were lumped together as related acquisitions and the last one was treated as an unrelated acquisition (Montgomery & Wilson, 1986). In the FTC categorization unrelatedness meant a different market or industry. It has also been used to describe a different strategic emphasis such as focusing on marketing instead of R&D (Swaminathan *et al.,*

2008).

In his article about acquisitions from a resource-based view Wernerfelt used two categories that were in effect similar to the related / unrelated taxonomy. He called these complimentary or supplementary acquisitions depending on whether the firm was strengthening its existing resources or acquiring new ones (Wernerfelt, 1984). Wernerfelt speculated that the best way to maximize existing market imperfections and acquire companies at low prices would be to build on one's most unusual resource. This way the company should be able to enter markets with relatively few targets but also a low level of competition.

Such rough categories fail to take into account the various motives behind the acquisitions as suggested by Bower (Bower, 2001). He divided acquisitions into five categories with distinct motives: to deal with overcapacity, to roll-up competitors to gain geographical clout, to extend into new products or markets, to substitute for R&D, and to invent a new industry. These are all also suited for different industries, the fourth type being most evident within emerging industries like software. The motives as suggested by Bower see acquisition strategy and corporate strategy in general in a much more deterministic process with firms as rational actors. This is reminiscent of the planning school of strategy with its tools of rational analysis and established categories as described by Mintzberg (1994).

Where Bower looked at acquisitions only as singular activities, Hopkins (1987a) studied the question whether firms indeed do exhibit consistent acquisition behavior that could be described as strategies. He identified altogether eight categories six of which were consistent (non-diversified, related/non-diversified, mixed-related, marketing-related, technology-related and financially-linked acquisitions) and two that were not (composite and reversal) (Hopkins, 1987a). A company was seen to follow a particular strategy if two-thirds or more of its acquisition were in the same category.

Non-diversified acquisitions were those that were mainly horizontal or

vertical in nature. Marketing-related were those where the acquirer and the target were in similar markets or with similar marketing characteristics. In a similar way technology-related acquisitions had firms with similar production or technological characteristics as their targets. Mixed-related was a group with acquisitions of both of the former types. Related/non-diversified was a combination of all of the above. Financially linked acquisition were those with no linkage to existing businesses. The composite strategy included firms that either alternated between diversified, related and financial strategies or that shifted comprehensively from one to another during the research period. Reversal included companies that changed from emphasizing acquisitions to strategies that emphasized divestitures (Hopkins, 1987a).

The above-mentioned studies suggest that acquisition strategies can be used to either strengthen the position of the acquirer in its existing markets by consolidating the segment or they can be used to enter new geographical markets or business segments. In the latter option the firm can utilize its existing resources in expanding the new business. With limited resources for acquisitions available, these options are usually at least somewhat exclusive, and the firms must make choices between them based on their relative attractiveness.

2.4 Acquisition performance

Research of acquisition performance is focusing on two separate but interlinked questions. Do acquisitions overall create value? If yes, what sort of acquisitions creates the most value, and how much of this is attributed to the acquirer?

On the first question there is also a lot of research into whether acquisitions succeed in creating value (Lubatkin, 1987; Singh & Montgomery, 1987; Shelton, 1988, Hopkins, 1987b). These studies have mainly focused on shareholder values and have tended to model these with identifying short-term abnormal stock market returns (Lubatkin, 1987; Singh & Montgomery, 1987; Shelton, 1988). Longer-term

measures include Tobin's q, pre-tax cash-flows and analyst ratings (Anand & Singh, 1997; Hayward, 2002). The results show that acquisitions do indeed create value, although the effect is clearer for target companies.

For the second question there exists a wide stream of research on the performance of different acquisition strategies and their relative benefits (Hopkins, 1987a; Hopkins, 1987b; Montgomery & Wilson, 1986). Earlier of these studies tended to look at large industrial companies (Hopkins, 1987b; Montgomery & Wilson, 1986). Recently there has also been research in service industries such as banking (Haleblian *et al.*, 2006). Their results suggest that related acquisitions create more value than unrelated yields answers with majority agreeing with the claim (Anand & Singh, 1997; Rheaume, 2008; Singh & Montgomery, 1987). However the theoretical basis for this is controversial with Seth arguing that there is no reason why related acquisitions should create more value (Seth, 1990).

The study of Hopkins (1987a) into the existence and performance was presented above. Hopkins's results were that companies that exhibited strategic fit in their acquisitions, namely they built their acquisitions around one core strength whether it was marketing or technology, fared better when measured with return on assets and return on sales than those that had broader, less focused strategies.

These studies look mostly on the performance of individual acquisitions and what factors affect their success rate. A more long-term view on acquisition strategies is taken by Laamanen & Keil in their research on acquisition programs (2008). They show that a high rate of acquisitions affects negatively stock-market performance of the acquirer in a three year window. However, those companies that undertook more than 10 acquisitions in the 1990s fared better in the long run than their competitors that made only 4-9 acquisitions. Also the variance of the acquisition rate had a significant negative impact so that those companies with regular acquisitions had a better performance. Similarly to the results of Hayward (2002) they found that prior acquisition experience could reduce these negative

effects on performance.

Identified acquisition strategies and performance drivers as well as the findings from earlier studies are presented in Table 1. There is no clear consensus of the relative benefits of diversification versus consolidation with both sides having several supporters. However, it seems clear that both types of acquisitions can create value to the acquirer. In the listed studies diversification was usually taken to mean acquisitions outside the industry. In the context of software industry diversification refers more to intra-industry diversification as described by Li and Greenwood (2004). They note that as the performance drivers in intra-industry diversification differ considerably from those in its inter-industry counterpart, lessons from studies of the latter can not be directly applied to the former. Next chapter will look more closely into what these differences are.

Table 1: Identified acquisition strategies and performance drivers

Acquisition Strategies/ types	Source	Measures of success	Findings
Complementary / supplementary	Wernerfelt 1984		
Non-diversified, related/non-diversified, mixed-related, marketing-related, technology-related, financially-linked, composite and reversal	Hopkins 1987a	ROA, ROE, sales growth	Acquisition strategies based on 'strategic fit' fare better than less focused strategies
Conglomerate, technology-related, marketing-related	Hopkins 1987b	Market share, market concentration, market growth, and market profitability.	Acquisition activity, in general, is associated with deterioration in market position.
Product concentric, horizontal and market concentric, conglomerate and vertical	Lubatkin 1987	Abnormal stock returns (monthly)	Acquisitions create value, but related diversification may not be better than others
Related and unrelated diversification	Singh 1987	Abnormal stock returns (daily)	Acquisitions create value, but related diversification is better than others
Unrelated, related complimentary, related supplementary and identical	Shelton 1988	Abnormal stock returns (3-day period around the first rumor)	Acquisitions create value, but related diversification is better than others
Unrelated, related	Seth 1990	Abnormal stock returns (5-day period around the first rumor)	Acquisitions create value, but related diversification may not be better than others
Consolidation-oriented and diversification-oriented	Anand 1997	Abnormal stock market returns; pretax operating cash flows and Tobin's q	Diversification-oriented acquisitions fare worse than consolidation-oriented
Consolidation, geographical consolidation, products or market extension, R&D substitution and inventing an industry	Bower 2001		
Market-entering, market-strengthening, market-elaborating, market-extending	Hayward 2002	Abnormal stock returns and analyst ratings	Similarity of firms, small prior acquisition losses and experience of prior acquisitions increase success rate of acquisitions
Unrelated, related	Rheaume 2008	Abnormal stock returns (2-day period)	Acquisitions create value and related diversification is better than others
Related, diversification, consolidation	Swaminathan 2008	Abnormal stock returns	The relative value of unrelated vs. related diversification depends on the motive of the merger

2.5 Intra-industry diversification

Most of the studies on diversification and acquisitions as a method to achieve it have focused on the relative benefits of related or unrelated diversification across industries (Li & Greenwood, 2004; Palich *et al.*, 2000). In intra-industry context the separation between unrelated and related diversification is less clear, although Eggers and Siggelkow (2009) suggest the terms diversification and exploration, respectively, for the two. The amount of studies focusing solely on diversification inside an industry is much lower (Li & Greenwood, 2004; Sebrek, 2008; Siggelkow, 2003; Eggers & Siggelkow, 2009). This difference is important as the potential benefits of intra-industry diversification are clearly different from those in inter-industry diversification (Li & Greenwood, 2004).

Firms can benefit from intra-industry diversification in three ways. First is the same logic of resource utilization as presented in the resource-based view (Penrose, 1959). In the context of a single industry this is even more evident because the similarity of inputs and outputs is likely to be much higher and so the potential for economies of scope is bigger (Li & Greenwood, 2004).

Secondly, firms that enter multiple market niches are likely to increase the amount of markets in which they have contact with their competitors. This increased contact will actually result in a lower level of competition as the competition moves from a stand-alone game with single moves to a game that is played repeatedly across several markets (Gimeno & Woo, 1996). In such an environment aggressive competitive actions are much more likely to be punished and the incentive to initiate such moves is correspondingly lower. Firms also acquire increasing knowledge of their competitors which enables them to correctly estimate potential responses to any considered actions (Li & Greenwood, 2004). An added benefit of multi-market contact is that, as the amount of firms competing in a given segment increases, it becomes more difficult for new competitors to enter the market due to the rising entry barriers (Sebrek, 2008).

Intra-industry diversification can also be thought of in the context of real options (Sebrek, 2008). Here the diversification efforts can be seen as buying call options on the particular niche of the market. This is especially so in software industry where the speed of technological innovation means that general capabilities are often more important than an individual product generation (Thomas, 1996). In his study Sebrek (2008) looks mostly at the technological forms of diversification such as patents or technology alliances. They offer a way for the company to diversify its R&D efforts in several directions without incurring additional costs. However, acquisitions that are motivated by R&D as suggested by Bower (2001) have quite similar dynamics in that they usually represent a relatively minor initial investment that is later on followed by a bigger payout – i.e. exercising the option.

From the consumer's point of view intra-industry diversification offers an additional important benefit. Consumers often prefer one-stop shopping in their businesses and companies that offer a better selection of products or services may attract more customers even though the individual products would not be best of their class (Siggelkow, 2003). The effect is reliant on the existence of shopping costs for the customer should he choose to pick products from several providers.

Empirical evidence on the benefits of intra-industry diversification is thin. Li and Greenwood (2004) found in their study of Canadian insurance industry that although diversification in itself did not improve performance, the increased multi-market contact with competitors was beneficial.

Siggelkow (2003) found out that in the US mutual fund industry fund performance was in fact adversely linked to the breadth of products each fund family had to offer. However, fund inflows were proportional to the breadth of product portfolio. In effect, diversification was bad for the customers but good for the owners. Siggelkow explains the findings by noting that only those fund families offering a broad portfolio fall in to the choice set of a customer or financial advisor.

Later Eggers and Siggelkow (2009) expanded the study to look whether the key success factor was diversification randomly across product categories or was an exploration strategy of expanding in closely related categories more beneficial. They found that exploration was linked to firm performance by a U-shaped curve in that fund families could benefit either from very low or very high levels of exploration. However, exploration beyond random diversification was not related to firm survival in any ways.

Mutual funds are an example of a Schumpeterian industry with rapid product life-cycles and low entry barriers, but although the results of Eggers and Siggelkow are interesting, it has to be noted that they are limited to a small niche of the financial services industry and thus may not be generalized easily.

Software industry offers several potential upsides of intra-industry diversification. As the industry consists of several businesses that often utilize similar technology but have different customers and products, companies can try to reduce the volatility of their revenues as suggested by Anand and Singh (1997). They can also escape maturing or declining businesses by diversifying into new segments (Matsusaka, 2001). A closer look at how and when this is done is presented in the next chapter on how industry landscape can be modeled by complexity theory.

2.6 Complexity theory and acquisition strategies

The concept of fitness landscapes was originally developed in evolutionary biology (Kauffman, 1993; Wright, 1931). It describes the evolutionary process of variation and selection on the level of an individual combination of genes. The fitness of the landscape refers to the amount of resources an organism can access in a particular location. The fitness of the organism refers to the locations and resources it has access to. Over time organisms that succeed will have developed a unique combination of characteristics in order to access sufficient amount of resources to

grow and reproduce. An important aspect of the model is that as evolutionary characteristics are acquired in a random process and as there may exist several fitness peaks with abundant resources ("rugged" landscape), one landscape can produce several, separate organisms that each dominate in their own environment.

Figure 3 presents both a smooth landscape with only one fitness peak and a rugged landscape with several peaks.
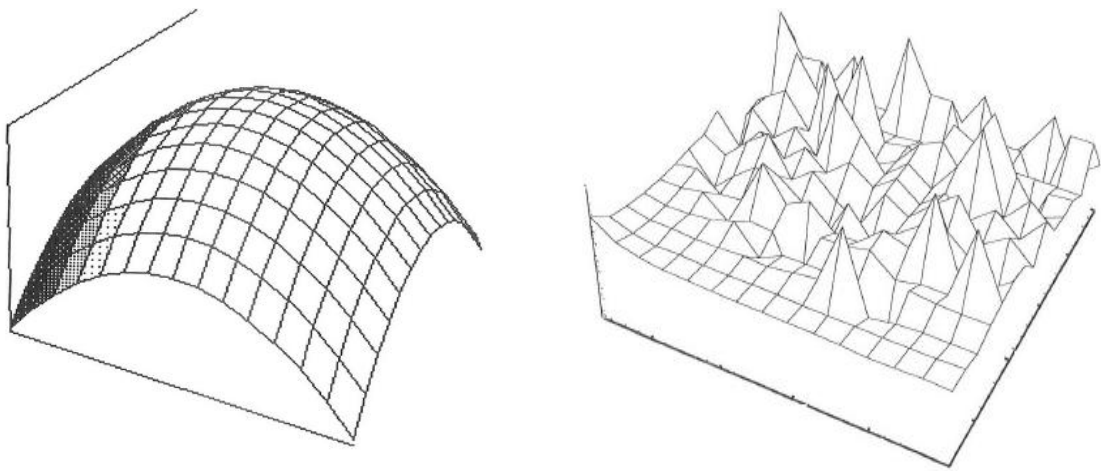
Figure 3: Smooth and rugged fitness landscapes (Levinthal & Warglien, 1999)

Fitness landscapes can also be used to model organizations and their strategic choices as well as those of individuals and teams (Levinthal, 1997; Levinthal & Warglien, 1999). Here the landscape refers to the organizational forms that are available to the organization and the fitness of the forms is merely the likelihood of survival that they provide to the organization. In other words the rate of survival for a particular organization is determined by its fitness level relative to the fittest organization in the population (Wilson & Bossert, 1971).

The organization in such a landscape starts out with an organizational form and in an attempt to increase its fitness it will adapt to different forms. However, this search process is path dependent and heavily influenced by the original form adopted at birth (Stinchcombe, 1965). So the same environment can produce

several dominant companies with very different organizational forms depending on their origin and the path they have taken, especially if the landscape is very rugged with several peaks.

The topology of the fitness landscape is defined by the level of interdependence between the different attributes (Levinthal, 1997; Levinthal & Warglien, 1999). When there is little interaction between the attributes then the landscape is relatively smooth as a change in one attribute only affects its local fitness value. As the level of interdependence increases, the landscape becomes more rugged as a change in one attribute can have a significant effect on the fitness value of other attributes as well. This interdependence is known as epistatic to population biologists (Smith, 1989).

Kauffman (1993) has created a model for analyzing the interactions in such a landscape. The model, termed NK model by Kauffman, describes an entity, organization or organism, as having N characteristics, each with a binary value, 0 or 1. In each environment there can thus exist 2^N unique organizations. The level of interdependence between the attributes is specified by the variable K. So if each attribute were influenced by e.g. 3 other attributes K would have a value of 3. In the simplest version NK= {N, 0} so all attributes are fully independent of each other. The most complex model has NK= {N, N-1} so the fitness value of every attribute is dependent also on the value of every other attribute. Thus every attribute can have 2^{K+1} different values and the total fitness value is calculated as an average of the individual fitness values of the attributes (Levinthal, 1997).

The level of K affects the landscape in two ways. First of all, in a landscape with low K two firms with similar values in all attributes but one should have fairly similar fitness values as the maximum difference between them is (K+1)/N. So the level of K defines the ruggedness of the landscape or the correlation between location and fitness (Gavetti & Levinthal, 2000).

Secondly, K describes the amount of possible peaks in the landscape. When

K=0, there is only one possible peak which is both local and global maximum, since each attribute can be optimized locally to produce the global optimum (Siggelkow & Levinthal, 2003). As the level of interdependence increases local optimization no longer results in the global maximum as an improvement in one attribute can have an adverse effect on one or several other attributes. So there may exist several local peaks where a change in any one attribute leaves the organization with a lower fitness value even if a change in several or all of the attributes could place the organization at the global peak with the highest possible fitness value (Kauffman, 1993; Levinthal, 1997).

When organizations look out for new and better forms they can follow one of several alternative adaptation processes. First, the firm can map its immediate neighborhood in a local search process by alternating only one attribute at a time (Levinthal, 1997; March & Simon, 1995). If it finds a configuration with a higher fitness value, it can adapt to that without incurring additional costs. This search is based on the firms past experience and knowledge and has also been dubbed as "experiential search" (Gavetti & Levinthal, 2000). Such local search works best in a relatively smooth landscape where the firm can "walk" its way to the global peak (Levinthal & Warglien, 1999).

Another way for the firm to search for superior forms is the random adaptation of completely new forms (Kauffman, 1993; March & Simon, 1958; Nelson & Winter 1982). This can be the result of either innovative activity, transformative technological change or the result of a previous failure. In such "long-jumps" it is assumed that the firms are not omniscient and it has to make its search in a more or less random way. The likelihood of a firm finding an improved position via random search is thus inversely related to its current success (Levinthal, 1997). This creates endogenous organizational inertia in the model with more successful organizations engaging more in local adaptation and less in random search. A slightly different model sees the firm searching based on its

cognitive map of the landscape that may not correspond fully with reality (Levinthal & Warglien, 1999).

In order to solve the problem of how to capture the value of the innovative nature of random search without losing the knowledge gained in current position organizations may engage in a search process known as recombination where they combine parts of different regions of the landscape (Levinthal & Warglien, 1999). Especially, if the regions have strong epistatic effects and the parts are known to have high fitness values, such recombination may enable a beneficial change in the total fitness as the highest peaks tend to lie close to each other (Kauffman, 1993). This result is reflected in the study of Siggelkow and Levinthal (2003) into the relationship between organizational form and exploration. They found that firms that are able to temporarily reduce their level of centralization and engage in multiple exploration processes whose results can then be regrouped in a process of centralization fare better than pure centralized or de-centralized competitors.

Based on a different theoretical foundation, Matsusaka (2001) has developed a model that shows the diversification of firms as a search process aiming to match the organizational capabilities with suitable businesses. The motive for this search process is a decline in the original business which can be seen as analogical to the population pressures in fitness landscape.

Studies on how organizations adapt to different fitness landscapes have up to date been either purely theoretical (Levinthal & Warglien, 1999) or have relied on simulation data with only empirical anecdotes to prove correspondence to real-world behavior (Gavetti & Levinthal, 2000; Knudsen & Levinthal, 2007; Levinthal, 1997; Siggelkow & Levinthal, 2003, 2005; Siggelkow & Rivkin, 2007). There is as of yet no empirical proof and evidence of the correlation between organizational design and firm performance is mixed (Siggelkow & Rivkin, 2007).

Originally fitness landscape was perceived as a static concept. However Levinthal (1997) has shown in his modeling study that there is no reason for the

landscape to remain constant. A Schumpeterian industry with changing competitive dynamics e.g. software industry, can be thought of as having a rugged landscape that is being redesigned at irregular intervals. The effect that competitor's actions have on the payoffs and fitness values has been modeled as a game theoretic problem with a better-than-Nash-equilibrium solution when the game is repeated (Levinthal & Warglien, 1999). Also the firm may use strategic alliances in its exploration process in order to map a wider area with local search (Sebrek, 2008).

Complexity theory helps to explain why both intra- and inter-segment acquisitions might make sense to a firm depending on its external environment. For a firm that is able to wrestle itself into a better position in its own segment by acquiring a local competitor it is beneficial to make an intra-segment acquisition. Respectively, for a firm that is facing an unattractive segment where it has no possibility to climb onto a better location inter-segment or even inter-industry acquisitions might be more useful.

2.7 Hypercompetition

As stated earlier, most of the studies on acquisition strategies and performance have been done in the context of industrial firms. As software industry differs quite a lot from more traditional industries it is important to observe these differences in more detail. Here I will use the concept of hypercompetition as presented by D'Aleni (1994) to describe the industry and its competitive settings.

The idea that capitalism is a constantly changing process where fiercest competition evolves from within was already presented by Schumpeter (1942) in his writing about the creative destruction. The description of Schumpeter was in direct contrast to the writings of such strategy gurus as Porter that described competition evolving predictably through the five forces that affect competitive forces (1980). Evidence of the existence of this competitive shift in the form of

decreasing persistence of abnormal profits in an increasing amount of industries was presented by Wiggins and Ruefli (2005).

Later the rapidly changing competitive environment has been described as hypercompetition. Such environment is characterized by D'Aveni (1994, 1995, 1999) as experiencing rapid technological and other forms of change, rapid product-lifecycles, lack of any competitive equilibrium states and little or no entry barriers, so new competitors are able to enter and transform the industry. In D'Avenis view hypercompetition is the following step from an oligopoly – a state where competition is high but abnormal profits can still be made (1995).

The five-force model as presented by Porter saw competition as a static force with most competitive pressure focusing on price. Dynamic competition, or hypercompetition, forces firms to constantly create new strategic assets to gain competitive advantage (Thomas, 1996). Such an environment favors firms with more flexible forms than the rigid, monopolies or oligopolies of the early 20th century (Volberda, 1996).

Hypercompetition may not affect all industries equally. Characteristics of industries that are particularly susceptible to hypercompetition are (1) consumer demand, (2) the knowledge base of firms and associated workers, (3) the declining height of entry barriers, and (4) the increasing frequency of alliances among firms (D'Aveni, 1994). Thomas (1996) has classified three factors that increase the dynamic resourcefulness – the capability and need to create new strategic resources - of industries. These factors are (1) transactor dynamism, factors of demand and supply that produce new innovations, (2) knowledge base, the depth and width of knowledge in the industry and (3) entry conditions, dynamism of the market structure. Examples of such industries include airlines and high-technology industries (Gimeno & Woo, 1996). Even in industries with such characteristics the emergence of hypercompetition often requires a transformational event such as changing demographics, looming bankruptcy of a major player in the industry or

the emergence of a foreign competitor with little capabilities for cooperative actions (Craig, 1996; D'Aveni, 1995; Nath & Newell, 1998).

The existence of hypercompetition and hypercompetitive industries is today accepted but the prevalence of hypercompetition is still argued about (Wiggins and Ruefli, 2005). Although D'Aveni (1994, 1995) and later Thomas (1996) stated that hypercompetition is increasing and a hypercompetitive shift took place in the US between 1950s and 1980s, their argument has raised opposition. The prevalence of hypercompetition may also vary in the course of time and is not necessarily a one-way trend (McNamara *et al.*, 2003).

In his study on the emergence of hypercompetition in Japanese beer industry Craig (1996) identified two types of capabilities that are needed to succeed in the environment. Specialized capabilities are those that are needed to prosper in a single round of hypercompetition by initiating a particular competitive advantage such as new product development. Because of the difficulties in creating specialized capabilities, they enable the company to collect oversized rents until competitors catch up or external forces shape the competitive landscape. Development of such capabilities may be hard for an organization that has been successful in a situation with static competition. In the case of market leading Japanese brewery an acute crisis of sales and profitability was required to implement the change of attitudes and processes (Craig, 1996).

General capabilities represent more complex bundles of resources and skills to activate resources. A company with general capabilities is capable of competing effectively for several rounds of hypercompetition and is able to introduce new sources of competitive advantage repeatedly (Craig, 1996). Craig argues that such capabilities represent the only sustainable source of competitive advantage in a hypercompetitive environment. Similar arguments are made by D'Aveni (1995) who lists the new seven S's - the elements that companies need in order to find and build temporary competitive advantages. These are superior stakeholder

satisfaction, strategic soothsaying, speed, surprise, sifting the rules of game, signaling strategic intent and simultaneous and sequential strategic thrusts.

A conflicting opinion is presented by Makadok (1997) who researched first- and early-mover advantages in money market mutual fund industry. The industry has low entry barriers and high imitability that should make it suitable for hypercompetition and erosion of first-mover advantages. Makadok showed that the companies that entered a segment first still showed considerable pricing and market-share advantage in comparison with their competitors. He explained the findings with the sluggishness of demand and the psychological costs of changing funds. Although the results may not be easily generalized they show that even in seemingly hypercompetitive industries it is possible to succeed with traditional competitive advantages.

Hypercompetition may take the forms of several rounds with the competitive advantage in each round coming from different source (Craig, 1996). The rounds may be distinguished by for example successive product generations. The rapid introduction of new product generations and the low entry barriers mean that firms may be forced to introduce new products even though that would be cannibalize their profits from existing products (Nault & Vandenbosch, 1996). An example of such behavior is the introduction of constantly new razor generations by Gillette in order to keep its main competitor behind (D'Aveni, 1999). Sengupta (2002) has developed a model that seeks to explain the effects of innovations and access to efficiency in hypercompetition.

In a hypercompetitive industry firms face two pressures. On one hand they are constantly challenged to develop new technology and introduce new products. On the other hand the intense competition that drives this technological development reduces the cashflow that is needed to support the R&D efforts (Thomas, 1996). This dynamic can easily lead firms to make acquisitions in order to take advantage of others R&D as suggested by Bower (2001).

In s-c-p model firm performance was inversely linked to intensity of competition so that strong competition was likely to lower firm performance (Porter, 1980). In hypercompetition competition is beneficial to a certain level - the performance of firms is linked to competitive rivalry through an inverse U-form (Thomas, 1996).

Success in a hypercompetitive industry is dependent on the capability of firm to take constant competitive actions (Ferrier *et al.*, 1999; Young *et al.*, 1996). These actions include but are not constrained to pricing actions such as discounts, marketing actions such as promotions and advertising campaigns, product actions like new product launches, capacity actions that include both new investments and increases of existing capacity, legal actions like law suits and signaling actions such as public statements and press announcements (Ferrier *et al.,* 1999). Young and his colleagues (1996) showed that the level of such activity is directly related to the profitability of a firm. A higher level of competitive actions also slows down the market share erosion and dethronement that are otherwise inevitable in a hypercompetitive industry (Ferrier *et al.,* 1999).

Successful firms may also exhibit what has been termed as 'continuous morphing'. This is defined as *"significant changes in the ranges of products and services offered, along with recon- figurations of the resources, capabilities, and structures employed to deliver the extended range of products and services"* (Rindova & Kotha, 2001). In the context of software industry this can mean a change in the source of core revenue source as in the case of Yahoo from a simple search engine to an Internet portal with a variety of complimentary services (Rindova & Kotha, 2001).

In a hypercompetitive industry the pressures to take competitive actions, acquisitions among them are higher than in more stable industries. This can lead to more acquisitions taking place than in a less competitive environment but it should also mean that acquisitions, when successful, really help the acquirer to achieve a

temporary competitive advantage and improve financial performance.

2.8 Software industry

Using D'Aveni's four-fold categorization of industries (1999) software industry could be best categorized as disequilibrium. Such industries experience constant disruptions by both incumbents trying to shake out their emerging competitors as well as challengers that are trying to take advantage of their slow-moving opponents. In the Schumpeterian spirit most of the value creation in such industries accrues to the innovators who create new products and succeed in their IPO.

Of the four preconditions for hypercompetition (D'Aveni, 1994) software industry fills easily two, namely low entry barriers and high knowledge-base of employees and firms. Also the last two, consumer demand and increasing level of alliances are evident as reported by Young *et al.* (1996).

Software industry is also a typical example of a multimarket industry as defined by Gimeno &Woo (1996) *"a group of distinct markets (i.e., markets for products or services that are not strong demand substitutes) that are strongly related on the supply side by the use of similar technologies and capabilities."*

The fierceness of competition between two firms under in such an industry under hypercompetitive conditions is proportional to the strategic similarity of the two as well as inversely proportional to the amount of multi-market contact between them (Gimeno & Woo, 1996). The strongest competition is between firms with very similar strategic emphasis but relatively few common markets.

Software industry has previously been studied as an example of a hypercompetitive industry by Young *et al.* (1996). Their hypothesis was that the amount of industry-level competitive activity such as product launches and marketing campaigns would have a negative effect on firm performance whereas such activity on firm-level would increase that performance. They also studied the

effect of industry-level horizontal cooperation such as M&As, licensing and technology consortia on the firm-level competitive activity. They found significant positive relationship between firm-level competitive actions and firm performance measured by return on assets and return on sales. However, they did not separate acquisitions from other competitive actions taken by firms.

3 Hypotheses

In this section I will present my hypotheses as well as the thought process behind them and the conceptual and theoretical ground on which they are based. The basis of the hypotheses lies in the diverse literature presented in the earlier section and its application into the topic, namely acquisition strategies in a hypercompetitive industry.

Hypotheses concerning only the pattern and timing of acquisitions give management information about the rate and intervals in which the planned acquisitions should take place. However, they give no insight into what would be suitable targets of acquisitions and where the company can use them to achieve growth.

Conversely, studies that only look at acquisitions in terms of how diversified or related the targets are do not give any insight into the temporal dimension of an acquisition strategy. Such insight may work in the context of individual acquisitions but it is a weak foundation for a comprehensive acquisition strategy.

Also, companies do not operate in a competitive void. External forces such as competitive pressures and acquisitions made by competitors also affect them. Therefore the hypotheses must also take into account the context of the company if they are to provide any insight into what acquisition strategies are best suited for different situations.

In order to avoid these pitfalls and to identify the optimal acquisition strategy I constructed my hypotheses to include both the diversification aspect as well as the rate of acquisitions. The first three hypotheses answer the broad question: "How far should firms diversify their acquisitions in a hypercompetitive environment?" The last two hypotheses look to answer more specific questions concerning inter-segmental acquisitions such as "Are acquisitions in segments with

previous contact better than unknown segments?" and "Does a high rate of entry into new segments affect survival and financial performance?"

In their research on the same data set Laamanen and Keil (unpublished) found that a proactive approach to acquisitions actually lowers a firm's longevity as it becomes more attractive as an acquisition target. However, they did not separate between different targets of acquisitions. They also used survival as their only metric so leaving open the possibility that those firms that undertake a lot of acquisitions and survive may perform better than their competitors.

3.1 Relatedness of targets

As presented before, a traditional perspective in the study of acquisition strategies has been to look at the level of inter-industry diversification (Hopkins, 1987a; Hopkins, 1987b; Lubatkin, 1987; Montgomery & Wilson, 1986; Shelton, 1988; Shelton, 1990). As software industry is clearly a multimarket industry (Gimeno & Woo, 1996) where intra-industry diversification plays a big part it is necessary to use concepts of both intra- and inter-industry diversification to model the possible acquisition strategies.

In an industry landscape consisting of separate segments there are basically three different types of acquisition from the point of diversification that a company can make. The first option would be to consolidate the current segment by making an intra-segment acquisition. Second would be to seek new growth by making an inter-segment acquisition in the same industry. The last option would be to make an inter-industry acquisition. The three options are graphically presented in Figure 4.
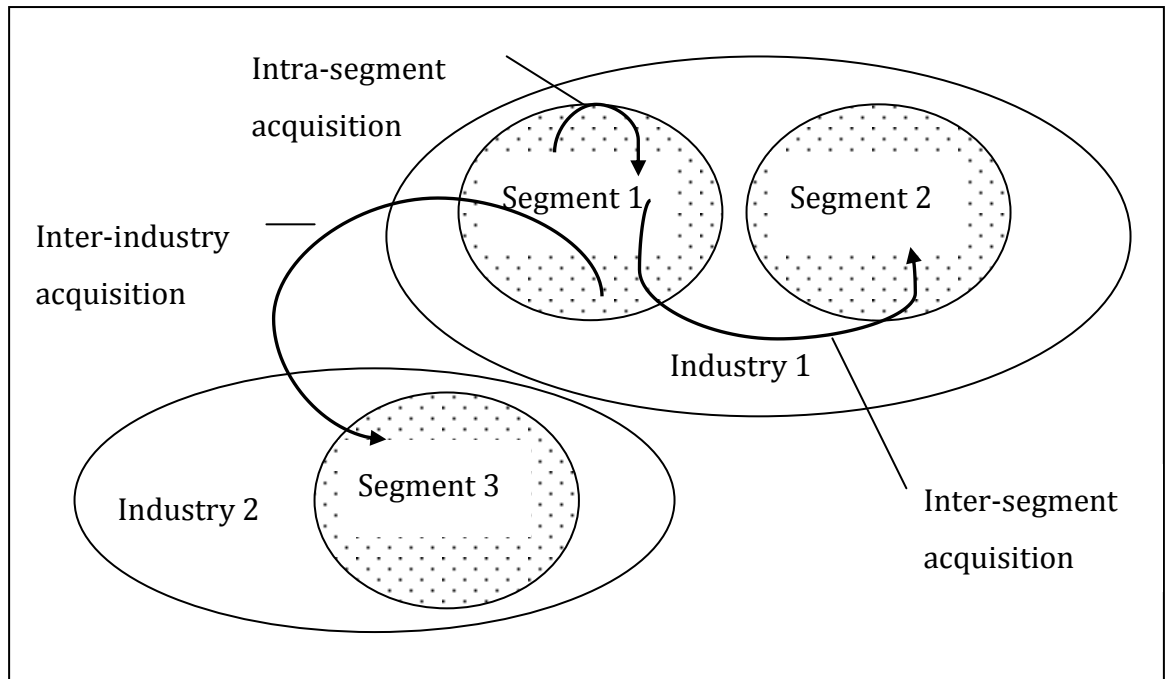
Figure 4: The different acquisition types by level of diversification

The first option is making an intra-segment acquisition, i.e. acquiring a direct competitor. This sort of consolidation-oriented acquisition should improve focal company's financial performance by strengthening its position in the segment (Anand & Singh, 1997). Such an acquisition could also be used to cut overcapacity in the segment and increase pricing power (Bower, 2001). Although the evidence in favor of related acquisitions is not unanimous (Lubatkin, 1987; Seth, 1990), they are seen to create value to both acquirers and targets (Singh & Montgomery, 1987; Shelton, 1988).

Hypothesis 1a: Intra-segment acquisitions improve the focal company's financial performance.

From the complexity theory point-of-view an intra-segment acquisition resembles local search on the fitness landscape. The company would already know the fitness value of the segment and the target (Levinthal, 1997; March & Simon, 1995). As local search does not take place unless the fitness value of the new location is higher than that of current location, intra-segment acquisitions should

be beneficial for firm survival.

Hypothesis 1b: Intra-segment acquisitions improve the focal company's survival rate.

Moving away from the focal firm's original segment, the second acquisition option would be for the firm to try to diversify its operations by entering a new segment in an inter-segment acquisition. Such an acquisition could have one or more of several different motives from acquiring R&D capabilities or expansion into new markets (Bower, 2001) to the need to seek complementary resources (Wernerfelt, 1984). Spreading operations in multiple, related segments should allow firms to utilize their resources more efficiently. Intra-segment acquisitions increase stability of the focal-firm by reducing volatility of cashflows (Anand & Singh, 1997). These factors should reflect in an improved financial performance of the focal firm.

Hypothesis 2a: Inter-segment acquisitions improve the focal company's financial performance.

Depending on how closely related the segments are, inter-segment acquisitions can be classified as either local search or exploration depending on whether the focal firm has made previous acquisitions from the segment. The potential effect of these previous acquisitions on performance and survival is examined in hypothesis four.

In a hypercompetitive industry inter-segmental acquisitions would be expected to be strongly present (Levinthal, 1997) as the landscape would be constantly changing. The continuous erosion of competitive advantages leads to the need for continuous morphing (Rindova and Kotha, 2001). Because firms can not rely on walking to top by local search they must engage in long-jumps in order to keep and improve their positions. Previous research on the same dataset has shown that companies that operated in multiple markets did indeed show better longevity (Laamanen & Keil, unpublished). Acquisitions present a faster way of

doing this than pure organic growth.

Hypothesis 2b: Inter-segment acquisitions improve the focal company's survival rate.

The third option for a company is to seek diversification by entering a totally new industry. Traditionally software industry has been more of a target for acquisitions from other industries with acquisitions where the acquirer was from another industry almost as prevalent as intra-industry acquisitions (Laamanen & Keil, unpublished). However, as software firms have grown in size and some of them have even entered the traditional bastion of blue-chip stocks - Dow Jones industrial Average, the idea of software firms diversifying into other industries is starting to look less far-fetched.

Such inter-industry diversification offers the focal company all the benefits of diversification as presented in the literature. These include market power advantages, internal market efficiencies and other advantages such as utilizing lumpy resources (Palich *et al.*, 2000).

Inter-industry acquisitions also present a way to reduce competitive pressure by lowering multi-market contact with direct competitors (Gimeno & Woo, 1996). This enables firms to improve their profits and reduces the risks of escalating competition.

Hypothesis 3a: Inter-industry acquisitions improve the focal company's financial performance.

For the purposes of this study the relative closeness of the target is not relevant so related and un-related industries are handled as the same. In a fitness landscape this diversification would be the equivalent of leaping off the map in order to locate a better position. This represents the ultimate form of long-jump but it would offer the potential advantage of operating in two landscapes with different attributes and correlations. Such insurance of operations by acquiring

diverse business is an established motive for acquisitions (Anand & Singh, 1997).

Hypothesis 3b: Inter-industry acquisitions improve the focal company's survival rate.

3.2 Previous acquisitions in target segment

In principal inter-segmental acquisitions can be classified as exploration, or random search. As the focal company enters outside of its known sphere it lacks the intimate knowledge of fitness values that it has in its own segment. This increases the potential for erroneous judgment. In M&A process this is the equivalent of incorrect pre-deal due diligence. The quality of information gathered in such process is often incorrect or blurry as evidenced by the large amount of problems that have surfaced only after the deal has been done (Harvey & Lusch, 1995). This would reduce the potential positive effects on both financial performance and survival.

The importance of previous acquisition experience in improving acquisition performance has been shown (Haleblian *et al.*, 2006). Firms can build new strongholds and improve their prospects of survival and profitability by entering new segments.

However, entering new businesses is inherently risky (Bane & Neubauer, 1981). Firms can reduce the uncertainty associated with an inter-segmental acquisition by targeting firms in segments where they have previously made acquisitions, irrelevant of what the performance of those acquisitions has been. This enables the focal firm to transform the incomputable uncertainty associated with the new segment into a computable risk associated with the acquisition of the target company.

When this is not the case and the inter-segmental acquisition is from a completely new segment, the financial performance and survival rate of the company should be weaker than otherwise.

Hypothesis 4a: Inter-segmental acquisitions from segments where the focal company has made previous acquisitions will have a bigger effect on focal firm's longevity.

Hypothesis 4b: Inter-segmental acquisitions from segments where the focal company has made previous acquisitions will have a bigger effect on financial performance.

3.3 Expansion rate of the focal company

If hypothesis two holds, inter-segment acquisitions improve financial performance of the focal companies. However, the rate and frequency of acquisitions matter at least as much, if not more, for the performance of acquirer than the selection of acquisition target with high-rate of acquisitions being detrimental to the acquirer's performance (Laamanen & Keil, 2008).

Other studies supporting these results show that companies need time to integrate acquisitions before making new ones (Haleblian & Finkelstein, 1999; Hayward, 2002). Especially for companies that enter new segments, a gradual acquisition strategy should be better as it gives time for orderly post-merger integration and avoids overwhelming the M&A resources. This strain on resources should also be reflected in the profitability of the company and thus affect its financial performance.

Hypothesis 5a: High rate of expansion into new segments affects financial performance negatively.

From the viewpoint of complexity theory prior acquisitions from another segment represent the difference between exploration, a focused search for new opportunities and diversification, spreading that can be explained by randomness (Eggers & Siggelkow, 2009). While their study shows that both diversification and exploration have positive effects on survival, these effects are U-shaped, in that too high a rate of either is actually damaging to survival of the focal company. In a

similar way, high rate of expansion into new segments should be detrimental to survival of the focal company.

Hypothesis 5b: High rate of expansion into new segments affects survival rate negatively.

4 Methods and data

In this section I will explain the methods used in this study as well as describe my data. The section includes description of the model used and the tests run on the data and the independent, dependent and control variables.

4.1 Sample

I selected software industry as a sample for the study. This industry offers a typical example of a hypercompetitive industry since the low entry barriers and rapid technological change guarantee a large amount of entries and exits (Young *et al.*, 1996). Software industry also offers ample material for studying acquisition strategies since the industry has been exhibiting heavy growth which has lured entrants from other industries as well as led to the emergence of big dominating players such as Oracle, Microsoft, SAP and Google that have used selective acquisitions to strengthen their portfolio.

The sample was constructed by downloading all the firms with the SIC codes 7370, 7371, 7372, 7374, 7379 from the Compustat database from the 27-year time period of 1980-2006. This includes both firms that offer prepackaged software as well as firms offering system design, information technology services or tailored programs. The initial sample had a total of 1969 firms of which 1961 were unique. Software industry emerged as independent from the computer hardware industry only around 1980 (Young *et al.*, 1996) so the sample captures quite well the entire development of the industry including its early growth in the 1980s and the Internet-fuelled boom of the 1990s with the subsequent bust in the start of the millennium. The sample includes all software firms that have been publicly traded in the US between 1980 and 2006 The sample is focused in the US but not contains also foreign firms as some of them had ADRs trading in the US that were included in the sample.

The sample was delimited by including only those firms that had achieved sales of more than 10 million US dollars at some point in this period. The cutoff-point was selected because of the information needed for segmenting the firms was rather difficult to get for the smallest firms. This left 1497 firms which passed the revenue threshold. However, the effect on total figures was rather small as the excluded firms represented never more than 0.5 % of annual revenues.

The development of firms and revenues is pictured in Figure 5. It shows how the size of the industry grew rapidly from the 1980 to the end of the 1980s and then, after a brief pause, grew almost fourfold in the decade from 1989 to 1999. At the same time the number of firms grew along a classical S-curve with slow grow in the first 20 years and then a fast leap from more than 100 to more than 500 hundred under 10 years. The bursting of the dot-com bubble led to a rapid decline in the amount of firms although total revenues decreased only slightly and temporarily. Overall, the figure resembles that of a maturing industry with its initial take-off followed by a period of rapid growth and the eventual consolidation and decline in firms.
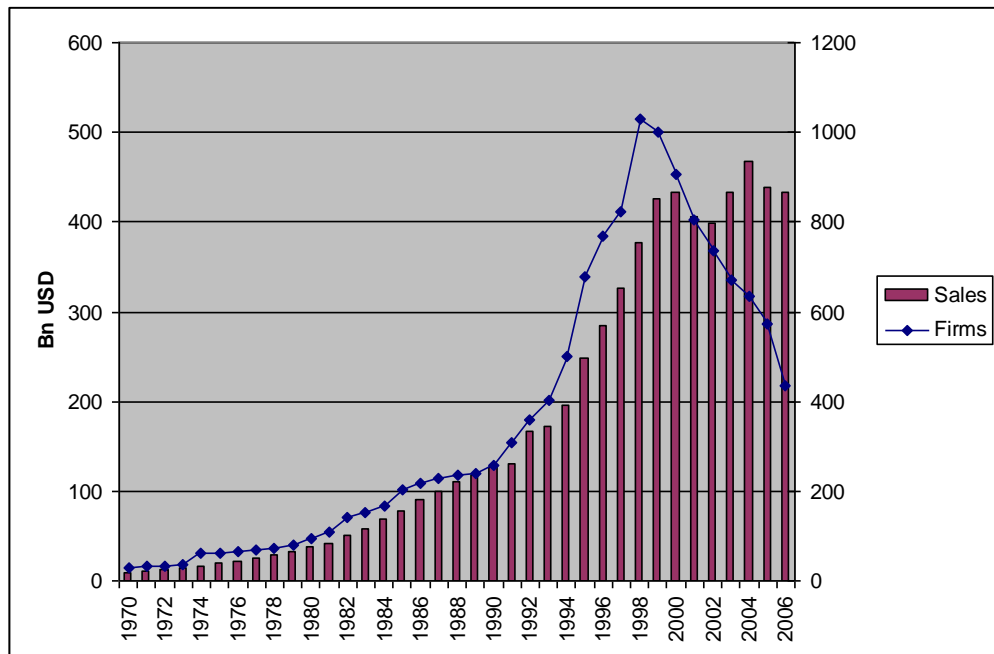
Figure 5: Development of amount of firms and revenues 1970-2006 (N=1497)

The same trend is also evident in Figure 6 that shows the entries and exits of sample firms in the time period. Before 1990 exits were relatively rare and only once exceeded the amount of entries. In mid-nineties the number of entries took suddenly off only to fall at the turn of the millennium when exits also took over entries and erased most of the increase in the number of firms of the last years.
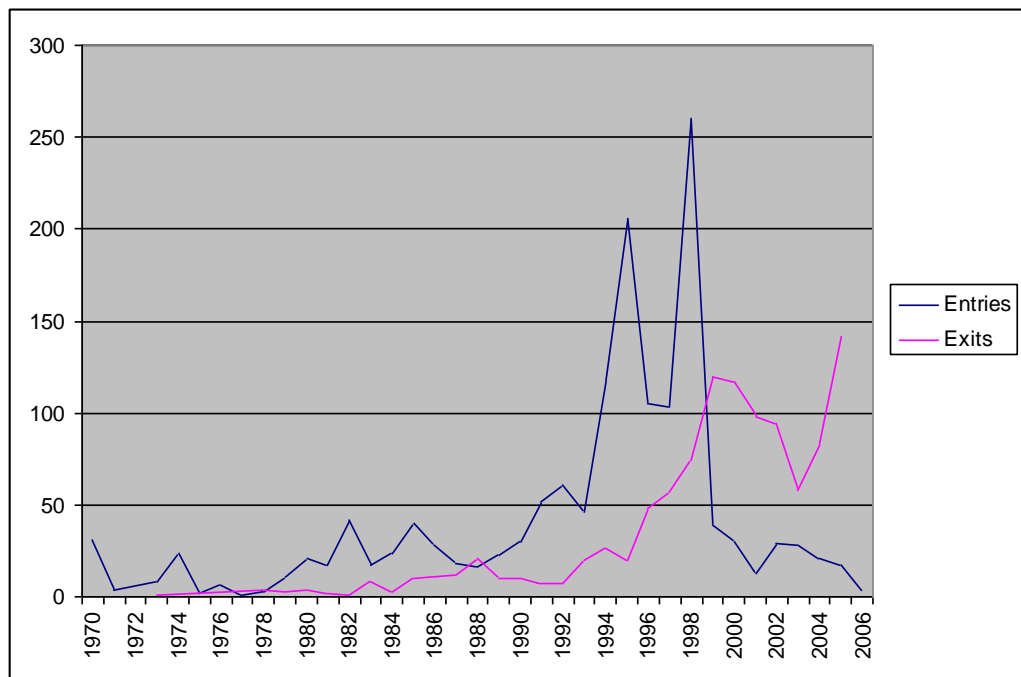
Figure 6: Entries and exits of firms 1970-2006

In order to evaluate the effects of acquisitions the dataset was combined with mergers and acquisitions data from the Thomson SDC Mergers and Acquisitions database. The sample includes all completed acquisitions from 1980 to 2006 where the target was an American firm, the acquirer had a SIC code of 737x and the acquisition resulted in majority ownership. This yielded a total of 10 954 acquisitions of which 3171 were made by companies that passed the threshold of 10 million dollars in revenues.

4.2 Segmentation

In order to model the software industry as a fitness landscape and to locate each firm in its proper place I had to find a way of categorizing the different firms. The most feasible way of doing this was to classify the firms into segments based on their principal business. The classification included in the SIC codes was too rough to be of any use so I had to look for other classification systems.

As I was unable to find a reliable classification system for the companies I had to create the segments ourselves. On this I relied on public information available from company reports, newspapers e.g. Business Week and financial information providers such as Yahoo! Finance. I tried to identify the principal business of the company and locate it according to that. New companies were initially tried to locate in existing segments but new segments were added as needed. No company was give more than one segment, which creates some limitations for the research that are handled in more detail in the last chapter.

Some of the segments are more functional like Business Process Management Software, some reflect the industry the company is serving like Healthcare Software and Services and Financial Software and Services, some like Information Technology Services are fairly general. There are also two segments namely Hi-tech manufacturing and Holding company that are not strictly connected to software industry. These were still included as to keep the sample representative. Altogether there are 27 segments. Largest of these both in number of firms and revenues was the information technology services segment with 91 firms in 2006 and revenue of 177 billion dollars. On average a segment had 16 firms and revenue of 16 billion in 2006 but medians for these measures were 8 and 6, respectively. A complete list of the segments with examples of companies is presented in Table 2. For 41 of the firms there was not sufficient information about their business that they could have been segmented. These firms were subsequently removed from the sample with 1456 firms remaining.

Table 2: List of the segments with example companies

Segment	Examples
Business intelligence	Business Objects, Cognos
Business process management software	Oracle, SAP
Communications software and services	Lucent Technologies, Equant
Defence contracting services	Saic, Titan
Device software optimization	Wind River Systems, Mercury Computer Systems
Educational applications	Riverdeep Group, Davidson & Associates
Engineering software	Structural Dynamics Research, Ask Group
Entertainment software and services	Widerthan Co, Mp3.Com
Financial software and services	First Data, Fiserv
Gaming software	Electronic Arts, Konami
Graphics software	Silicon Graphics, Adobe Systems
Healthcare software and services	Cerner, HLTH
Hi-tech manufacturing	Applera, Continuum
Holding company	Emvelco, Halo Technology Holdings
Information technology resource management software	Compuware, BMC Software
Information technology services	IBM, Fujitsu
Internet marketing services	Web.com, JL Halsey
Internet platform	Disney Internet Group, Ebay
Internet search engines	Google, Yahoo
Internet service provider	Level 3 communications, Earthlink
Location based software and services	Navteq, AT Road
Network management software	International Network Services, Netiq
Network security software	Symantec, Verisign
Operating systems software	Microsoft, Wang Labs
Storage management software	Veritas Software, Ashton-Tate
Travel software and services	Sabre holdings, Galileo International
Virtualization and remote access of applications	Citrix Systems, Savvis

Figure 7 shows the development of sales by segment for the classified firms. It is evident from the figure that information technology services is clearly the biggest segment with sales starting from over 90 percent in the early years and averaging almost half in the last decade. This may be partly due to the fact that the

definition of the segment is rather ambiguous in comparison with some of the other segments.
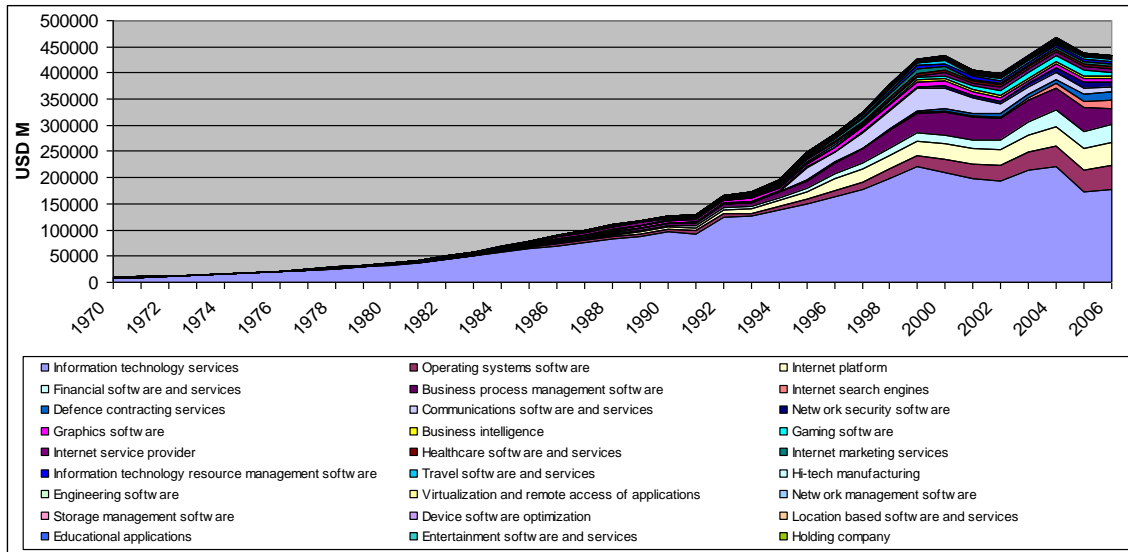
Figure 7: Development of sales by segment 1970-2006 (n=1456)

The same dominance is evident to a lesser extent in Figure 8 which shows the number of firms in each segment for the research period. Here the share of firms in information technology services starts from 60 percent of the total and ends with little more than one fifth in 2006. So, most of the growth in the number of firms during the dot-com boom did not actually come from the segment, although it had clearly the biggest share of revenues.
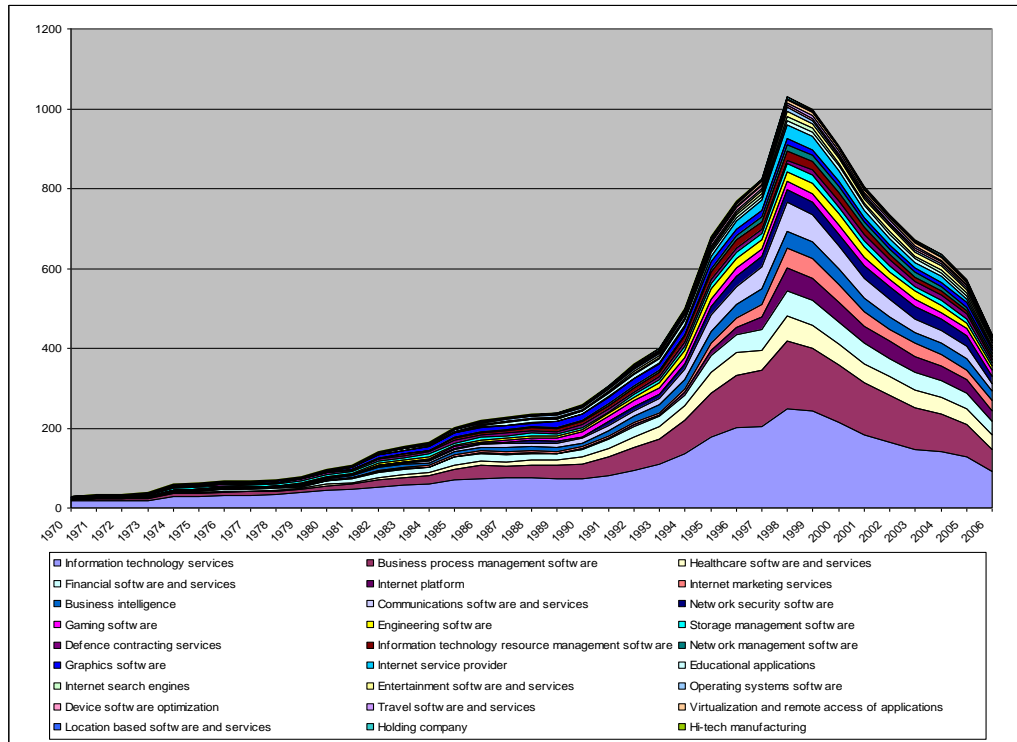
Figure 8: Number of firms by segment: 1970-2006

4.3 Acquisitions

All the acquisitions were categorized also by the segment of the target and the acquirer. Here, the sources were the SDC database itself as well as the Internet resources that had been utilized in categorizing the initial sample. All the companies outside the software industry were lumped together as "other industry" as there was initially no differentiation between different industries. Of the 3171 acquisitions the segment of the target company could not be identified in 88 cases. These were left out and the sample was cut to 3083 acquisitions. Of these acquisitions only 1 829 had any information concerning the deal value and only 772 had listed revenue of the target company. This lack of information places limits on the available variables when building the model.

Of the three different types of acquisitions that were identified in the previous section most common were intra-segment acquisitions that presented 1

504 cases or 48,8 percent of the total number. Inter-segment acquisitions were the second biggest group with 1 163 acquisitions or 37,7 percent. Inter-industry acquisitions made up the rest with 416 cases or 13,5 percent. Figure 9 shows how

Figure 9: Share of different acquisitions and the total amount of acquisitions
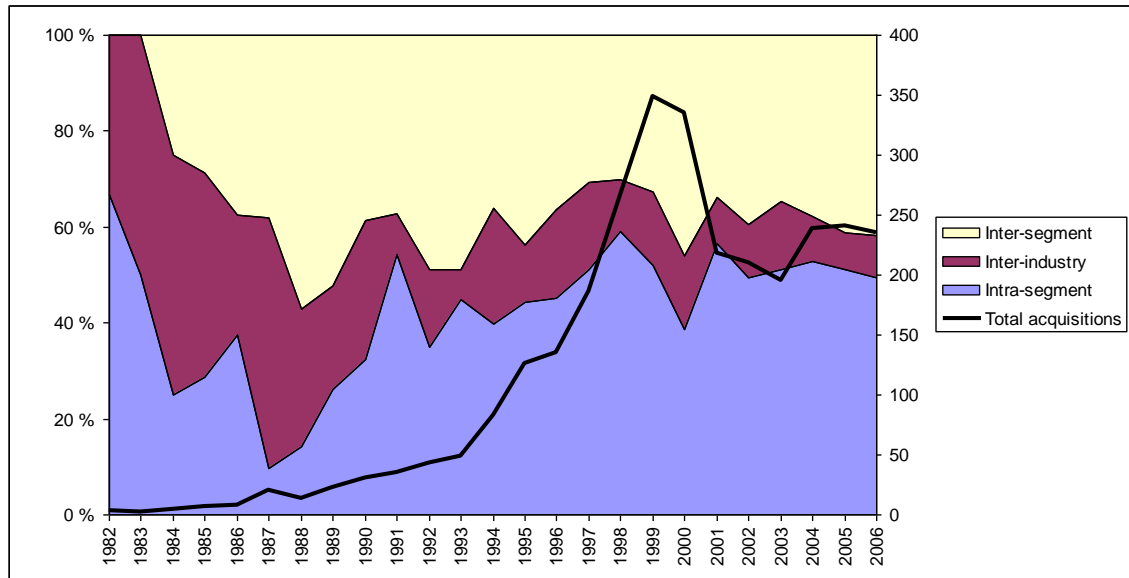
the share of different acquisitions has stayed relatively stable over the last decade even though the annual amount of all acquisitions has more than doubled. Excluded from the figure are those acquisitions that where acquisition year was not identified or it fell outside the scope of the study (i.e. 2007).

In order to model the organizational search practiced by the companies I mapped all the acquisitions where the companies were participating, either as an acquirer or a target. Figure 10 presents the industry as a network bound by inter-segmental acquisitions. The size of each segment is proportional to the proportion of intra-segment acquisitions of total acquisitions by companies in that segment. The strength of the lines connecting the segments highlights the amount of acquisitions between those two segments as a proportion of total acquisitions by companies in those segments. The small size of the "other industry" is due to the fact that no acquirers were listed in that segment so consequently there were no

intra-segment acquisitions either.
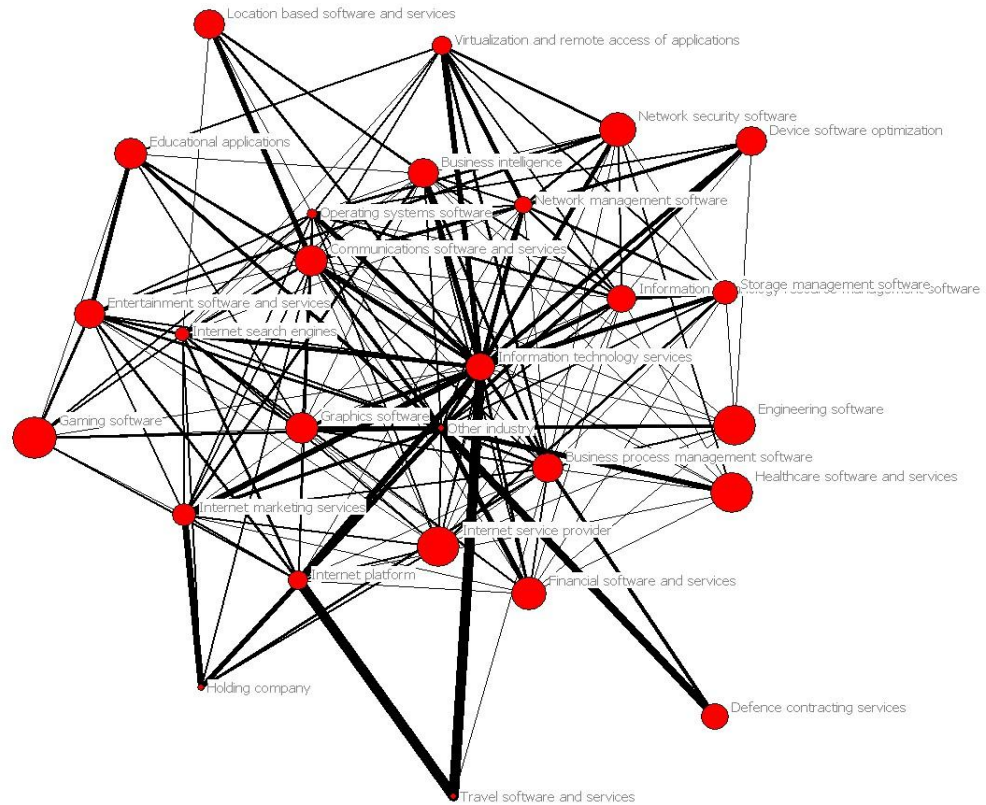
Figure 10: Proportions of intra- and inter-segment and inter-industry acquisitions by segment

Conceptually, the different segments of the software industry are mapped as different locations in the fitness landscape of software industry. The fitness of the company is a function of the different segments in which it is undertaking acquisitions and the interactions between those segments. The fitness of the segments is defined as the level of survival and growth the companies in these segments have. It is assumed that the companies can operate in all segments and thus the payoffs of the segments are identical to all.

4.4 Dependent variables

Studies into value created by acquisitions have usually tended to rely on stock-market measures by estimating abnormal stock returns caused by the merger announcement (Lubatkin, 1987; Singh & Montgomery, 1987; Shelton, 1988; Seth, 1990). The use of such measures relies on the assumption that the short-term reaction of the stock market is a good indicator of the long-term value created by the deal. As this study looks at long-term survival and performance as a function of acquisition strategy instead of focusing on single acquisitions, such measures were not applicable for this study. Instead I have constructed two measures one of which tracks the survival of the focal firm and the other focusing on the focal firm's financial performance. The benefit of such a dual approach is that as survival is the primary objective of the firm itself, an exit by acquisition may actually create more value to the shareholders of the target firm.

Firm survival has been used previously in several studies on population ecology that have a research period of several decades ((Agarwal, Sarkar, & Echamebadi, 2002; Dobrev & Carroll, 2003; Suarez & Utterback, 1995). It is an especially crucial measure in an industry with relatively low average lifespan. In this sample the realized average age of existence after the IPO was only 6,9 years. When still existing firms were taken into account this rose to 9,0 years.

Reasons for stopping operations as an independent firm vary by firm. Most common in this sample was being the target of an acquisition. Other possibilities include bankruptcy, liquidation or a LBO. In this study the focus was on exits either by bankruptcy, both Chapter 7 and Chapter 11 of the US bankruptcy code, or acquisition. These were also the most numerous reasons for exit representing 653 of the 822 or 79 per cent of the cases where cause of exit was identified.

As survival may be an insufficient measure in itself, I also measured the financial performance of the firm. Here the problem lies in determining what part of performance is affected by acquisitions, especially when deal value and

information concerning the size of target is lacking in so many cases.

Measures of acquisition performance can focus either on financial performance from the external, shareholders point of view or from the internal perspective of the firm. Both ways have their benefits and drawbacks.

When measuring acquisition performance from shareholder perspective, most popular measure has been abnormal short-term changes in stock-prices (Anand, 1997; Bower, 2001; Hayward, 2002; Laamanen & Keil, 2008; Lubatkin, 1987; Singh, 1987; Shelton, 1988; Seth, 1990; Swaminathan, 2008). The problem with this measure is that it reflects only short-term effects of the acquisition announcement. In order to evaluate the long-term effectiveness of acquisition strategies it would be necessary to use long-term stock market measures. Although such measures have been used in studies on acquisition performances by e.g. Junna (2008), it is not clear how well these measures capture the effect of acquisitions on stock prices.

Another stockholder measure would have been earnings per share or EPS that has long been an important measure of business performance. However, the intense attention investors and analysts are paying to this number is leading managers to routinely round-up their numbers in order to be able to announce forecast-beating earnings (Das & Zhang, 2003).

Internal measures include ratios such as ROE and ROA that have also been used to measure acquisition performance (Hopkins, 1987a). These measures were not used since there are intrinsic differences between industries in their ROE levels (Hall & Weiss, 1967). So, firms making inter-industry acquisitions from industries with lower natural levels of ROE would be unduly punished.

Another argument against using ratios as measures was that, as most of the firms were expanding from a relatively small asset base, there would be big variance in the ratios. Profit margins were discarded for the same reason, as companies would usually have a period of high losses in relation to their sales

before, if ever, becoming profitable.

Instead of a measure based on stock price, I used the EBIT (profit before interest and taxes less extraordinary items) as a measure of profitability. The motivation for this was that although firms may undertake acquisitions for several motives as suggested by Trautwein (1990), these acquisitions can create shareholder value only if they result in increased profit. EBIT is broadly similar to the pretax-operating cash flow that has also been used to measure acquisition success (Anand & Singh, 1997), especially in an industry with low tangible assets that would need to be depreciated.

4.5 Independent variables

The focus of this study is the effect of acquisition strategies on survival rate and financial performance of the focal firm in a hypercompetitive industry. In order to differentiate between the different strategies I had to develop separate, extensive variables concerning individual acquisitions and their interactions.

Intra-segment acquisitions: These represent a large share of the acquisitions as companies tried to consolidate their position within the segments. They were measured by calculating the average number of acquisitions within the segment during the focal and two previous years

Inter-segment acquisitions: This type of acquisition was almost as common as intra-segment ones and they are vital for firms that try to search for new locations in the industry landscape. These were measured by taking the average number of acquisitions from other segments in the software industry during the focal and two previous years

Inter-industry acquisitions: These acquisitions were not that numerous but they represent an important strategy of long-jumping to an entirely new industry. They were similarly measured by taking the average number of acquisitions from other industries during the focal and two previous years

Entering new segments: When a firm enters a segment other than its own, it takes considerably more risks. These risks should then reflect on its financial performance. This is measured by creating a dummy variable that gets a value of 1 when an inter-segmental acquisition is from a segment where the focal firm has not made previous acquisitions.

Rate of entering new segments: A high rate of acquisitions is generally adversely linked to financial performance since resources for integrating new companies are limited and not easily divided (Laamanen & Keil, 2008). In a similar manner, it is expected that expansion into new segments would eat management resources and thus be inversely linked to financial performance. This is measured by calculating the amount of new segments the firm has entered divided by the age of the firm.

4.6 Control variables

When undertaking acquisitions companies must pay attention not only to their own operations but also to the activities of their competitors. Mergers and acquisitions are not only driven by internal business logic, they are also affected by M&A patterns in the industry and in the supply chain (Öberg & Holmström, 2006). High levels of acquisition activity, or merger waves as they are sometimes called, tend to produce competing bids, drive prices higher and thus reduce the value available to the acquirer (Jarrell & Poulsen, 1989; Rhodes-Kropf & Viswanathan, 2004).

In order to avoid being trapped in a merger wave with increasing prices and diminishing returns firms can look for segments with relatively low rate of acquisition activity. Wernerfelt (1984) suggests that when operating in an imperfect market such as the market for acquisitions, firms can obtain best value by basing their purchases on their most rare resource where they face the lowest level of competition. This is especially important in inter-segmental acquisitions

where firms are more likely to target complimentary resources to build an effective bundle instead of just consolidating their existing resource bundle by supplementary acquisitions from the same segment. So, inter-segmental acquisitions from a segment with low level of acquisition activity should create better value than others.

Acquisition activity of the target segment: Acquirers presumably create the highest value when they can base their acquisitions on their most rare resource and make acquisitions where there are few or no competitive bidders (Wernerfelt, 1984). This is measured by calculating the annual average of acquisitions in the target segment based on the amount of acquisitions in the previous three years. In cases where a company has made inter-segment acquisitions from several segments in one year, an average of all the segments is calculated.

Survival rate in the focal firm's segment: Laamanen and Keil (forthcoming) found in their study on the same sample that firms in segments with high number of inter-segment and inter-industry acquisitions exhibit lower longevity. Since exiting firms include all acquisition targets as well as firms going bankrupt or liquidating business, it is reasonable to assume that low survival rate would reflect negatively on the firm's survival rate as well. The survival rate is calculated by dividing all the firms that exit the segment in a given year by the number of firms in that segment at the beginning of the year. The focal firm is left out from both the denominator as well as the nominator in order to reduce multicollinearity when calculating survival rates.

Growth of the focal firm's segment: Firms in a segment that is growing very rapidly should exhibit higher survival rate and better firm performance. Growth of the segment can also be used to measure the overall fitness levels in the segment that should be reflected in the relative popularity of local search versus random search. Local search is more likely to take place in the later periods as firms have acquired relatively high fitness levels where there is only a low probability of

making a long-jump to a location with high fitness value (Levinthal, 1997). The *sales growth of the segment* is used as an inverse proxy of segment life-cycle. It is measured by calculating the sales growth in the segment during the focal year as percentage of previous year's sales.

Concentration of market share: A segment with high concentration of market share lowers the longevity of the focal firm significantly (Laamanen & Keil, forthcoming). In a similar way it should also lower the financial performance of the focal firm. This concentration is measured by calculating the share of sales that the three biggest firms have in the segment of the focal firm.

Market share of the focal firm: A firm with high market share should be able to survive better and achieve higher performance than its competitors. The results are controlled for this by calculating the share of sales the focal firm commands in its primary segment.

Deal size: The size of the deal in relation to the market value of the firm is an important factor in how much the focal firm's performance is affected. This is calculated by dividing the deal size by the focal firm's market value at the end of previous year. Unfortunately, deal value was reported in only 1 834 cases. As the missing cases were most likely those that were so small that the acquirer doesn't have to make an announcement, the absence of more than 1 000 acquisitions could have created a bias in the results. In order to avoid this, this variable was used in only one of the models.

Dot-com boom: In order to control for the fact that during the dot-com boom in the late 1990s stock valuations reached unsustainable heights that also led to depressed acquirer returns (Uhlenbruck *et al.*, 2006). This was also a period of a dramatic business cycle that led to wide distortions of capital (Callahan & Garrison, 2003). In order to control for this fact I added a dummy variable that gets a value of 1 for the years 1996-2000 and a zero for other years. This corresponds roughly with the time from Netscape's IPO in August 1995 to the stock market correction

that began in March 2000.

Profitability: When testing for effects on survival, it was important to take into account the initial profitability of the firm. The effects of profitability on survival can be two-fold. High profitability decreases the possibility of bankruptcy thus improving survival prospects (Karels & Prakash, 1987). On the other hand, more profitable companies are likely to be acquired (Barnes, 1990). So the effect of profitability on survival should depend on what is the relative importance of bankruptcy and acquisitions as causes of exit. Here profitability was measured as 3-year average of EBIT-margin, or earnings before taxes and interest divided by net sales. As EBIT was already accounted for in testing effects on financial performance, the variable was used only in survival analysis.

4.7 Model

Since the hypotheses used two different dependent variables, namely survival and financial performance, there was also a need for two different models. For testing the hypotheses 1b-5b that measured firm survival, a Cox proportional hazard model (Cox, 1972; Cox & Oakes, 1984) was used. A semi-parametric version of the model was chosen, since this version makes no strict assumptions about the baseline hazard function that could yield biased estimates of the effects that covariates have on the hazard rate (Blossfeld & Rohwer, 1995). This sort of model may as well be used with time-varying as well as time-independent covariates (Cox, 1972). Another benefit of the proportional model is that it allows for the fact that although events are recorded on an annual basis, they may take place any time during the year. The formal regression model has a form of

$$h(t) = h_0 \exp\{\beta' X(t)\} \tag{1}$$

Where *h0 (t)* is the baseline hazard function, *β* is a vector consisting of regression coefficients to be estimated and *X* is the covariates vector. The proportional hazards model makes no assumptions about the baseline hazard

vector *h0 (t)*. The Cox's partial likelihood estimator provides an effective way of estimating β without making any estimates concerning the baseline hazard. Thus the baseline hazard is not reliant on the covariates that are used in the model (Laamanen & Keil, forthcoming). This sort of estimation method for firm survival has been widely used in the literature including the studies of Mata *et al.* (1995) and Shane & Foo (1999).

For testing hypotheses 1a-5a on how acquisitions affect profitability, I used an ordinary least squares regression (OLS) model. The dataset is a typical example of panel data with a large number of groups with rather few observations in each group. For such a dataset an OLS model allows to control for both within-unit effects as well as between-unit effects as long as the data is homoscedastic and autocorrelation is not present (Greene, 2000). The OLS estimator can be formulated as

$$y_i = i\alpha_i + \mathbf{X}_i\beta + \varepsilon_i \qquad (2)$$

where i is the number of the observation α is the unit-specific effect and β the time-specific effect.

5 Results

In this section I will present the results obtained from the data as well as the potential falsification of the hypotheses. For purposes of clarity the section is divided in two sub-sections. The first will present the results on hypotheses 1b-5b that concerned effects of acquisition strategies on survival of the focal firm along with some robustness analysis of the results. The second section presents the results on the effects that acquisition strategy has on the financial performance, in this case profitability, of the focal firm.

First I present some descriptive statistics of the data in addition to those already presented in the previous chapter. Table 3 shows the correlations between the different variables. The risk of multicollinearity is fairly low as the correlations between dependent and independent variables are not statistically significant. The small sample is explained by the lack of information concerning deal sizes. However, leaving deal size out of the correlation table does not change the results markedly, although the amount of observations rises to 10 489.

Table 3: Correlation between the variables

N=1362	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Acquisition activity	1												
2 Survival	-.04	1											
3 Segment Growth	.00	.08	1										
4 Concentration	.04	-.06	.07	1									
5 Market Share	.03	.08	.05	.22	1								
6 Deal Size	-.01	.03	.00	-.02	.00	1							
7 EBIT margin	-.04	.05	.00	-.01	.06	.00	1						
8 Boom	.19	.06	.03	-.11	-.06	.05	-.04	1					
9 Intra Segment	-.13	-.05	-.02	-.09	.01	.01	.02	.08	1				
10 Inter Segment	.36	.00	.04	.21	.45	.03	.03	.02	-.09	1			
11 Inter Industry	-.08	.05	.00	.00	.06	.00	-.02	.02	.18	.03	1		
12 Enter New	.20	.02	.06	.08	.04	.02	-.10	.17	-.23	.21	-.05	1	
13 Rate Of Entry	.18	-.01	.05	.12	.06	.00	-.03	.18	-.04	.41	.13	.45	1

More descriptive statistics of the variables are shown in Table 4. There it becomes clear that even in a hypercompetitive industry acquisitions are the exception, rather than the norm, as the mean of the three-year average of acquisitions is no more than 0.09 for acquisitions from the same segment and even less for other types of acquisitions. Also more than three fourths of the acquisitions where value is known are valued at less than 50 million.

Table 4: Descriptive statistics of the variables

Variable	N	Mean	SD	P1	P25	Median	P75	P99	Min	Max
Acquisition activity	12174	1.12	6.28	0	0	0	0	36.5	0	72
Survival	11756	0.92	0.08	0.65	0.88	0.93	0.98	1	0	1
Segment Growth	12174	0.24	1.6	-0.43	0.03	0.11	0.26	1.38	-0.97	26.64
Concentration	12174	0.67	0.19	0	0.52	0.69	0.81	1	0	1
Market Share	12174	0.05	0.14	0	0	0	0.03	0.87	0	1
Deal Size	1447	107	546	0	0	10	44	1884	0	11881
EBIT margin	12013	-2.92	108	-18.51	-0.25	0	0.09	0.36	-10 400	0.73
IntraSeg	12174	0.09	0.35	0	0	0	0	1.33	0	13
InterSeg	12174	0.07	0.27	0	0	0	0	1	0	5.67
InterInd	12174	0.03	0.15	0	0	0	0	0.67	0	4

5.1 Effects of acquisitions on survival

As a first step to test my hypotheses on the effect of acquisitions on survival, I created a base model with all the control variables in it to test for their significance. The results of this model are shown in Table 5. The problem is that the limited amount of observations on deal sizes reduces the reliability of the results. The model with deal size left out yields a much larger sample with much higher statistical significance. The results show that as expected, survival of other firms in the segment has a big positive effect on the survival of the focal firm itself. Likewise, the market share of focal firm in the segment has a positive effect on survival. Other controlling variables including acquisition activity in the target firms segment, segment growth, concentration of the segment and the dot-com

boom have negative effects, even though these are statistically insignificant.

Table 5: Results for a Cox proportional hazards model with only control variables (*=p<0.1, **=p<0.05 and ***=p<0.01)

VARIABLES	base	base less Deal Size
Survival	-1.944**	-3.168***
Acquisition activity	0.00323	0.0043
Segment Growth	0.00403	0.000185
Concentration	0.981*	0.0713
Market Share	-1.534**	-1.779***
Boom	0.117	0.117
EBIT margin	-0.000163	0.00872
Deal Size	-0.0001	
Observations	1340	10172
Spells	1340	10172
Number of firms	490	1350
Events	136	958
Chi2	13.95	109.4

Next I started to test my hypotheses, namely hypotheses 1a-5a. The results of these are shown in Table 6. Hypothesis 1a predicted that intra-segment acquisitions would have a positive effect on the focal firm's longevity. Unfortunately, with 95 per cent confidence level the opposite holds, and intra-segment acquisitions in fact increase the hazard rate for firms. The same holds for inter-segment acquisitions where hypothesis 2a predicted that firms that engage in those would have a bigger chance of survival. The effect of inter-segment acquisitions is negative with $p<0.05$ and the co-efficient is even bigger than in intra-segment acquisitions.

Table 6: The Cox proportional hypothesis model test for hypotheses 1a-4a and 5

	(1)	(2)	(3)	(4)	(5)	(6)

VARIABLES	base	h1a	h2a	h3a	h4a	h5a
Survival	-3.642***	-3.597***	-3.617***	-3.639***	-3.586***	-3.535***
Acquisition	0.00745*	0.00652	0.00242	0.00772*	0.00161	0.000836
Segment Growth	-0.00429	-0.00427	-0.00423	-0.00438	-0.00470	-0.00364
Concentration	-0.0884	-0.0627	-0.0977	-0.0923	-0.0850	-0.0640
Market Share	-1.288**	-1.328***	-1.455***	-1.273**	-1.491***	-1.369***
Boom	0.0795	0.0734	0.0810	0.0804	0.0784	0.0827
EBIT margin	0.00872	0.00851	0.00864	0.00875	0.00865	0.00838
IntraSeg		0.150**				
InterSeg			0.288**		0.262*	
InterInd				-0.170		
interSeg_x_					0.246	
Enter New						
Enter New					-0.0137	
Rate Of Entry						0.514***
Observations	9971	9971	9971	9971	9971	9971
Spells	9971	9971	9971	9971	9971	9971
Number of firms	1347	1347	1347	1347	1347	1347
Events	792	792	792	792	792	792
Chi2	89.09	93.21	93.30	89.61	95.35	101.4

Hypothesis 3a predicted that inter-industry acquisitions would have a positive effect on focal firm's longevity. The coefficient for inter-industry acquisitions is negative, thus indicating a positive effect on longevity, but the effect is hardly statistically significant. So, inter-industry acquisitions don't seem to have much effect on survival.

Hypothesis 4a stated that firms that make inter-segmental acquisitions into segments where they have no previous experience would experience less positive effects on their survival rate. The fifth column of the table shows that this may hold, as the interaction term between entering a new segment and making an inter-segmental acquisition is positive, although not significant statistically.

Hypothesis 5a predicted that a rapid rate of entry into new segments would lower the focal firm's longevity. There is a positive coefficient which is also statistically significant at 99 per cent, so this hypothesis is supported by the data. So, firms that entered new segments rapidly were more likely to fail.

In order to test the robustness of the results I made several runs while varying the model slightly by leaving out certain control variables or changing the time frames for the independent variables. The results are presented in Table 7. The columns present different models built for the hypotheses 1a-5a in ascending order. The first three rows present the results of different time frames for acquisition activity, namely 3, 1 and 5 years. The results from these are not inconsistent in themselves, in that all models have positive coefficients for both intra-segment and inter-segment acquisitions. However, the statistical significance of the results varies so that inter-segmental acquisitions have a negative effect with 5 % C.I with both 1 and 5-year models, whereas three year model has a statistically significant effect for only intra-segmental acquisitions. The rate of entry has a consistent negative effect on survival for all three time frames, with the only difference being between 1 and 5 per cent confidence levels.

Table 7: Results of hypotheses with different models

Model type/ Effect on survival (+=negative, Underlined=p<0.01)	IntraSeg	InterSeg	InterInd	Enter New	Rate Of Entry
Time periods					
3yr	+				<u>+</u>
1yr		+			+
5yr		+			<u>+</u>
Partial models					
3yr-AcqAct	+				<u>+</u>
3yr-Survival	+				<u>+</u>
3yr-SegGrowth	+				<u>+</u>
3yr-Concentration	+				<u>+</u>
3yr-Boom	+	+			<u>+</u>
3yr-MarketShare					+
1yr-Survival		+			<u>+</u>
1yr-AcqAct		+			+

1yr-SegGrowth		+	+
1yr-Concentration		+	+
1yr-MarketShare			+
1yr-Boom		+	+
5yr-Survival		+	±
5yr-AcqAct		+	±
5yr-SegGrowth		+	±
5yr-Concentration		+	±
5yr-MarketShare			+
5yr-Boom		+	±
Square terms			
3yrSqr&3yr	+	+	±
1yrSqr&1yr			+
5yrSqr&5yr		/+	±

The following rows show the results for each of the different time frames with one control variable left out. The results do not change much. In fact the only significant changes happen when market share of the focal firm is omitted. This implies that the success of acquisition strategy is strongly dependent on firm size in general and the market position that the focal firm has in its own segment in particular. However, there is no moderated effect between market share and acquisitions as the table on testing interdependence between market share and acquisition activity in the Appendixes shows.

Omitting the dot-com boom from the model changes the results slightly for the three year time frame, as the negative effect of inter-segmental acquisitions become statistically significant. With other time frames any such changes do not occur, which could imply that end of the nineties were a period when acquisitions from other segments were more common and thus their negative effect on survival was more limited.

The bottom three rows simply show the results of a test for possible curvilinear effects that acquisitions might have on survival. These are tested by adding a square-term of acquisition activity in the model. However, the results are fairly similar and in no cases do both the single term and the square term show

statistically significant effects.

To sum up the results of the test, they quite clearly prove hypotheses 1b and 2b false. This means that intra- and inter-segment acquisitions in fact lower survival rates of the focal firms. On hypothesis 3b, namely the effect of inter-industry acquisitions, the results are inconclusive. This is also the case with hypothesis 4b, how entering new segment affects inter-segmental acquisitions. The strongest results are for the rate of entry into new segments that has clearly negative effect on survival, regardless of time frame. This is in support of hypothesis 5b. The coefficients for all the independent variables are still markedly smaller than for the market share and survival rate, so acquisitions affect survival less than focal firm's initial position and competitive dynamics in the segment.

5.2 Additional analysis on acquisitions and survival

As the results of survival analysis contradicted most of the initial hypotheses, there was a clear need for additional exploratory research in order to explain the difference between assumptions and results. The following three chapters look at how different methods of exit affect the results, as well as whether results are affected by financial performance of the focal company or the ongoing phase in the industry life-cycle. The chapters are based on post-hoc analysis of the data and earlier research on the subject.

5.3 Acquisitions versus bankruptcies

Bankruptcy and becoming acquired are very different outcomes for both the managers and the shareholders. Whereas bankruptcy is usually the end of a longer process during which the company may have tried acquisitions as a method of relocating in better position with higher fitness value, acquisitions can happen rather unexpectedly. Becoming acquired does not mean failure for the company in the sense that bankruptcy does and it is therefore not self-evident why acquisitions should have a similar effect on the possibilities of the focal company ending

bankrupt as on its likelihood of being acquired.

In order to see how the results depending on whether the cause of exit was bankruptcy or acquisition the dataset was split by the method of exit. The results of the two separate sets are shown in Table 8. The results on bankruptcies are only suggestive as there were only 38 such events during the period of study. They were also tested for rare events logistic regression (King & Zeng, 2001) but the results were similar as with an ordinary Cox regression.

Table 8: Effect of variables on survival depending on method of exit

Variable / Effect on survival (+=negative, Underlined=p<0.01)	Acquisitions	Bankruptcies
Survival	<u>-</u>	
Acquisition activity		
Segment Growth		
Concentration		
Market Share	-	
Boom	<u>+</u>	
EBIT margin	+	
IntraSeg	+	
InterSeg		+
InterInd		
interSeg_x_		
Enter New		
Rate Of Entry	+	

There are clear differences between how different variables affect the likelihood of the event occurring. Whereas with bankruptcies only inter-segmental acquisitions have a statistically effect, acquisitions are affected by dot-com boom, profitability, intra-segment acquisitions and the rate of entry into new segments, all of which have a negative effect and market share and survival which have a positive effect on survival. Most significant are the effects of survival and dot-com boom that are both significant at 1 per cent level, with the rest being significant at 5 per cent level.

The connection between high profitability and increased likelihood of becoming acquired support earlier research by Barnes (1990). More profitable

companies offer better prospects for acquisition as they are shown to have a viable business with less need for a laborious turnaround process. However, market share that is also an indirect measure of size has a negative effect as bigger companies have less prospective acquirers.

The effect of acquisitions on likelihood of becoming acquired suggests that firms that try to increase their market share in their focal segment actually increase their attractiveness as an acquisition target. Earlier research has shown that proactive approach to acquisitions did not affect the effects of inter-segmental acquisitions on survival but there was no separation between different types of acquisitions by the focal firms (Laamanen & Keil, unpublished).

5.4 Effects of acquirer's financial position

Acquisitions consume both financial and managerial resources of the acquirer (Wernerfelt, 1984; Matsusaka, 2001). As managerial resources are hard to quantify, it is therefore necessary to look closer into how the availability of financial resources affects the effects that acquisitions have on survival rates. It would be expected that companies with more resources available would be able to better implement the integration process and thus have smaller negative effects from acquisitions.

In order to see whether there were differences between acquirers depending on the amount of financial resources they had available I created two new dummy variables that take into account both the current availability of financial resources as well as the capability of the company to generate new resources from its existing business.

The variables were constructed by calculating the annual median of EBIT margin and equity ratio for each segment. EBIT margin was chosen as it was used already in the study as a measure of profitability. It also measures the ability of the company to transform sales into profit and generating resources to build new

businesses. Equity ratio was taken as a measure of solvency and because integrating new acquisitions may eat up equity in the first years after the acquisition. Each segment was then divided by two and the two sides were tested separately for both variables. There was also a third variable that grouped the firms in three groups: those that had both variables better than the segment median, those that had both lower than the median, and the rest. The last group was the biggest containing 314 of the total of 638 exits in the set that were identifies as acquisitions or bankruptcies.

The results of these tests are shown in Table 9. There are marked differences between the top and the bottom half in both equity ratio and EBIT margin. The most significant is what kind of effect intra- and inter-segment acquisitions have. For the better firms, intra-segment acquisitions have a significant negative effect on survival, whereas inter-segment acquisitions have no effect. For firms with lower financial strength the effect is the exact opposite. Also, a high rate of entry into new segments seems to have a stronger effect on less profitable firms.

Table 9: Effect of financial position of the acquirer

Variable / Effect on survival (+=negative, Underlined=p<0.01)	Equity ratio		EBIT margin		Both		
	Top	Bottom	Top	Bottom	Top	Bottom	Middle
Survival	-	-		$\underline{-}$			$\underline{-}$
Acquisition activity				+			
Segment Growth							
Concentration							
Market Share				-			
Boom	+	+	$\underline{\pm}$	$\underline{\pm}$	$\underline{\pm}$	+	+
EBIT margin							
IntraSeg	+		+		+		
InterSeg		+		+			
InterInd							
interSeg_x_ Enter New							
Rate Of Entry	+	$\underline{\pm}$		$\underline{\pm}$		$\underline{\pm}$	$\underline{\pm}$

The differences suggest that companies with bigger resources are better positioned to gain foothold in new markets. The major threat to those companies seems to lie in acquiring too strong a position in their focal segment. The results are not separated according to the method of exit but as was noted earlier, intra-segment acquisitions increased the likelihood of becoming acquired, which suggests that intra-segment acquisitions by financially strong companies make them a good target for new entrants planning to enter the market.

On the other hand, weaker companies are more affected by inter-segmental acquisitions and the effect of entering new segments at a high rate is more significant which suggests that entering new segments strains their resources and increases their risks of becoming victims of bankruptcy or acquisition.

As Figure 11 shows, companies that entered bankruptcy and those were acquired in a weaker financial condition differed quite substantially from those that had a strong financial position when they were acquired. The figure plots the median EBIT margin and equity ratio for each of the groups for the three year period before their exits. The main difference lies in the fact that the strongest acquired companies were profitable for the whole period and were thus able to increase their equity ratio. At the time of acquisition they were in quite good financial position with median EBIT margin of 11 per cent and equity ratio of 79 per cent.
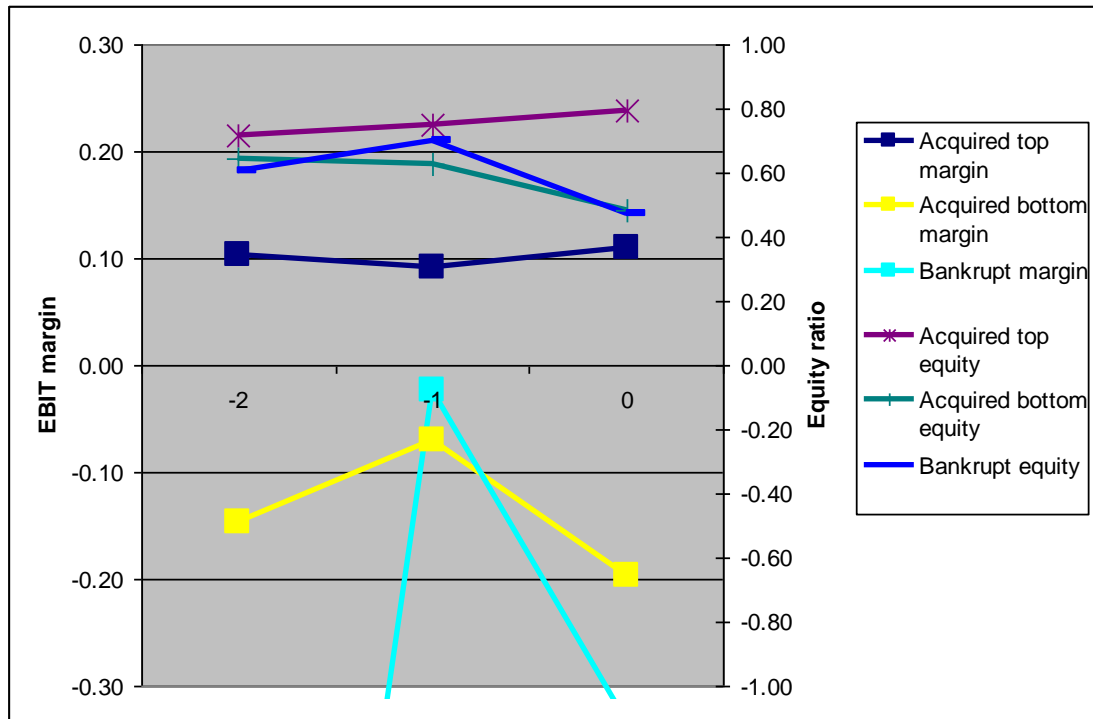
Figure 11: EBIT margin and equity ratio of the exited companies in 3-year period before the exit

The bankrupt and acquired companies with weak position on the other hand lost money constantly and were unable to get sufficient new investments from their owners which led to a decreasing equity ratio. At the point of exit their equity ratios are almost identical with 49 and 47 per cent for the acquired and bankrupt, respectively. The biggest reason why bankrupt companies did not end up acquired lies probably in the fact that their average EBIT margin in the three year period preceding the exit was -54 percent, almost four times as big loss as the acquired companies' -14 per cent.
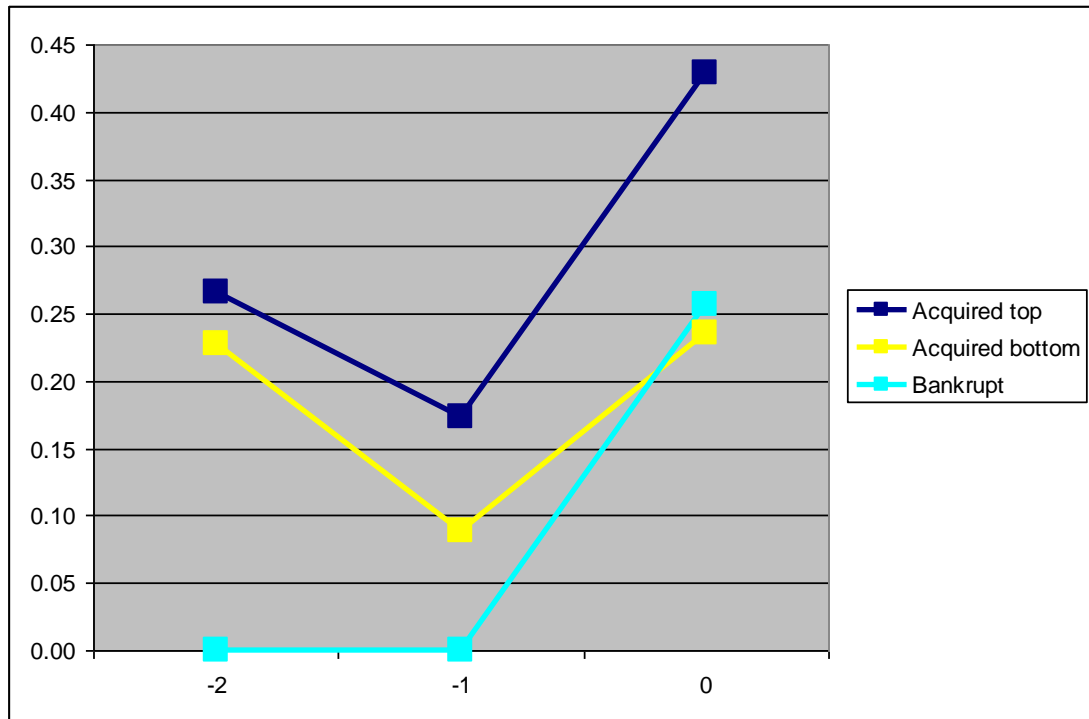
Figure 12: Average number of acquisitions annually by company type

The bigger financial resources of the top acquired companies also enabled them to engage in substantially more acquisitions as can be seen from Figure 12. The difference between top and bottom companies increased steadily from 0.04 acquisitions in year T-2 to 0.19 acquisitions in year T. It should be noted that these are all mean averages as median figures for all type of acquisitions were zero. The sudden leap in acquisitions made by companies heading for bankruptcy in their final year is explained by a small number of companies that engaged in several acquisitions and thus raised the mean numbers.

5.5 Differences by time period

As industries mature, the survival rates as well as the effects of such factors as firm size and density, change (Agarwal, Sarkar & Echambadi, 2002). The data indicates that during the time period under focus software industry underwent a transition from the introductory phase of the industry lifecycle (Porter, 1980) through the

growth phase and into the maturing phase. In order to see how the results change based on the life-cycle phase the data was divided into three subsets according to these periods.

The first period spans from 1980 to 1993. In this period the number of firms remained under 400 and number of annual entries exceeded 50 only once. This can be seen as the early growth period of the industry. All of the segments were already present but only 16 had more than 5 firms in them. The revenues of the industry were 172 billion dollars of which 73 per cent was accounted by information technology services for. This was also a period with relatively few exits as only 65 firms went either bankrupt or were acquired.

During the growth period from 1994 to 1998 the number of firms in the industry more than doubled from 401 to 1 030. The average growth rate of total revenues was 17 per cent and revenues more than doubled to 377 billion dollars. The number of exits increased even more than the number of firms with 198 firms making an exit.

Looking at the number of new entries and exits, it is clear that software industry entered its mature phase already in 1999. That was the year when number of exits exceeded the number of entrants for the first time. By 2006 the total number of firms decreased to 434 while revenues had increased to 434 billion. In this period 382 firms exited the industry by bankruptcy or acquisition while the average annual entry rate decreased to 23 from 119.

Table 10 presents the results of Cox-regression with the three different time periods. It is remarkable that during the initial period none of the independent or control variables were statistically significant. This is partly duet to the fact that there were relatively few exits during that period as well as quite few acquisitions.

Table 10: Effect of variables on survival depending on time period

Variable / Effect on survival (+=negative, Underlined=p<0.01)	1980-1993 (65 events)	1994-1998 (198 events)	1999-2006 (382 events)
Survival			<u> </u>

Acquisition activity	+	
Segment Growth		-
Concentration		
Market Share	-	-
Boom		
EBIT margin		
IntraSeg		
InterSeg	+	
InterInd		
interSeg_x_EnterNew		
Rate Of Entry	<u>+</u>	<u>+</u>

During the dot-com boom period inter-segmental acquisitions rise in significance and they as well as entering new segments have a significant negative effect on survival. Of the control variables only acquisition activity of target segment and market share are significant and their effects are, respectively, negative and positive. The negative effect of acquisition activity in target segment, inter-segmental acquisitions and high rate of entry suggest the growth phase as a period when the choice of where to enter was especially important. The companies made many jumps across the industry landscape but they more often than not misestimated the fitness value of their target.

In the last period the only statistically significant independent variable is the rate of entry into new segments. Of control variables survival rate, segment growth and market share are all significant with a positive effect on survival. In the maturity period segments start to consolidate and most important variables concern the focal firm's primary segment. In this phase a segment with high rate of survival and fast growth offers a local peak where the firm's biggest threat comes from too rapid expansion into other segments.

5.6 Effects on acquirer's financial performance

The testing of hypotheses concerning the effect different types of acquisitions have
5.6
on the financial performance of focal companies was done by, as described earlier,
by constructing an OLS regression model. The dependent variable was profitability
5.6

5.6

5.6

measured as EBIT.

Testing EBIT for autocorrelation of first-order with the Woolridge autocorrelation test (Woolridge, 2002) yielded F-value of 282.3 which indicates high probability (p<0.001) of first-order autocorrelation. As there was evidence of both heteroscedasticity and autocorrelation there was a need to correct for those in the model.

The correction was done by using Driscoll-Kraay standard errors that automatically assume the error structure to be autocorrelated, heteroscedastic and even correlated across panels (Driscoll & Kraay, 1998).

The initial results with a complete model and 3 year time frames for both EBIT, survival and acquisition activities are presented in Table 11. The coefficients for intra- and inter-segment and inter-industry are positive, which would imply that they have a positive effect on financial performance. A high rate of entry seems to decrease profit.

Although, the F-test for between-groups effects are statistically significant at p<0.001, the explanatory power of within-effects is quite weak, as the R-square for the within variance is only 0.13. The model also contains several insignificant variables such as acquisition activity in target segment and segment growth.

Table 11: Effects of acquisition activity on EBIT (3 year average)

Regression with Driscoll-Kraay standard errors		Numberof obs	=	11712	
Method: Fixed-effects regression		Number of groups	=	1378	
Group variable (i): gvkey		F(10, 1377)	=	20.49	
maximum lag: 2		Prob >F	=	0	
		Within R-squared	=	0.1336	
EBIT	Coef.	Drisc/Kraay Std. Err.	t	P>t	[95% Conf. Interval]
IntraSeg	47.56258	12.83988	3.7	0	22.37474	72.75042
InterSeg	518.508	106.1195	4.89	0	310.3346	726.6813
InterInd	86.17057	30.10125	2.86	0.004	27.1213	145.2198
Rate of Entry	-378.6393	53.56756	-7.07	0	-483.7222	-273.5564

Acquisition activity	-1.397501	0.872755	-1.6	0.11	-3.109574	0.3145711
Concentration	132.4307	54.91591	2.41	0.016	24.70283	240.1586
Market Share	697.7915	248.798	2.8	0.005	209.7274	1185.856
Survival	-220.4644	82.29141	-2.68	0.007	-381.8945	-59.03427
Boom	37.5091	10.695	3.51	0	16.52885	58.48935
Segment Growth	2.460201	1.417135	1.74	0.083	-0.319776	5.240179
_cons	77.58267	40.93367	1.9	0.058	-2.716429	157.8818

Leaving out the all variables that are insignificant at 5 per cent confidence level results in a model that is shown in Table 12. This does not change the explanatory power of the model markedly, as the R-square actually drops a bit. Also the F-value for between-groups effects drops while remaining very significant. The signs of coefficients for independent variables are still the same as with the initial model. They also seem to support my hypotheses 1a-5a. The signs of the control variables are also as expected in that high market share boosts profits. The dot com boom boosts profits but the effect is quite small compared to other variables.

The effect of survival on profits is rather interesting. It seems that a high rate of survival in the focal firm's segment actually reduces profits. This may be because total sales of the industry and individual segments were growing most of the time, so a reduction in the number of firms leads to reduced competition and thus increased profits for the remaining firms.

Table 12: Effects of acquisition activity on EBIT (3 year average), updated

Regression with Driscoll-Kraay standard errors		Number of obs	=	11712	
Method: Fixed-effects regression		Number of groups	=	1378	
Group variable (i): gvkey		F(7, 1377)	=	10.86	
maximum lag: 2		Prob > F	=	0	
		within R-squared	=	0.1296	
		Drisc/Kraay			
EBIT	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
IntraSeg	45.88145	12.98215	3.53	0	20.41452	71.34838
InterSeg	511.1782	102.9594	4.96	0	309.204	713.1523
InterInd	88.12389	29.48728	2.99	0.003	30.27903	145.9688
Rate Of Entry	-385.5543	53.20708	-7.25	0	-489.93	-281.1786
Market Share	633.4596	225.0334	2.81	0.005	192.0143	1074.905
Survival	-185.3106	74.53592	-2.49	0.013	-331.5268	-39.09433

Boom	29.05974	8.570028	3.39	0.001	12.24802	45.87147
_cons	139.6168	60.17649	2.32	0.02	21.56929	257.6643

By looking at the tables above, it becomes clear that acquisitions do have a direct effect on profit, as measured by EBIT. However, intra-segment acquisitions seem to have a much smaller effect than inter-segment acquisitions. To some extent this may be because their positive influence on profit is captured by the increasing market share. To test this assumption I constructed a model to measure how market share is affected by acquisitions. This model used three-year average of market share as the dependent variable. Only the three different types of acquisitions are used as independent variables.

The results with a model with are shown in Table 13. The explanatory power of the model is quite weak with within R-square only 0.03. The independent variables still explain some of the between-groups effects.

Table 13: Effects of acquisition activity on market share

Regression with Driscoll-Kraay standard errors		Number of obs		=	12174	
Method: Fixed-effects regression		Number of groups		=	1382	
Group variable (i): gvkey		F(3, 1381)		=	16.56	
maximum lag: 2		Prob > F		=	0	
		Within R-squared		=	0.0263	
		Drisc/Kraay				
Market Share	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
IntraSeg	0.003083	0.001488	2.07	0.039	0.000163	0.006003
InterSeg	0.049924	0.007115	7.02	0	0.035966	0.063882
InterInd	0.00476	0.006222	0.76	0.444	-0.00745	0.016965
_cons	0.047587	0.002124	22.41	0	0.043421	0.051753

The model shows that all acquisitions do increase market share, but the effect is significantly higher for inter-segment acquisitions than for intra-segment ones. However, this may be a case of reverse-causality with firms that have a high market share in their original segment expanding into new segments by

acquisitions. I tested for this by using lagged market share of up to three years. The results stayed roughly similar, which indicates that reverse causality is at least not the main cause of this effect.

To test for hypothesis 4a that assumed that inter-segment acquisitions where the acquirer enters a new segment have smaller positive effect on financial performance I added a moderating variable of entering a new segment with an inter-segment acquisition. The results of the model with all the variables significant at 5 percent confidence level are shown in Table 14. Both the F-test as well as the R-square gives quite large values which suggest that the model explains quite well both within- and between-groups effects. The moderating term has a statistically very significant negative coefficient. This means that inter-segment acquisitions have a smaller impact on profit when they are made on a new segment.

Table 14: Effect on EBIT of inter-segment acquisitions while entering a new segment

Regression with Driscoll-Kraay standard errors		Number of obs		=	12132	
Method: Fixed-effects regression		Number of groups		=	1381	
Group variable (i): gvkey		F(7, 1380)		=	12.17	
maximum lag: 2		Prob > F		=	0	
		within R-squared		=	0.1916	
EBIT	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
InterSeg	793.237	130.1161	6.1	0	537.9903	1048.484
interSeg_x_Enter New	-198.9356	42.41801	-4.69	0	-282.1464	-115.7249
Enter New	-194.1192	59.8581	-3.24	0.001	-311.5419	-76.69648
Acquisition activity	-2.823757	1.04492	-2.7	0.007	-4.873561	-0.7739524
Concentration	117.0217	43.87348	2.67	0.008	30.95578	203.0877
Market Share	714.0174	221.9908	3.22	0.001	278.5415	1149.493
Boom	40.15377	10.18223	3.94	0	20.17945	60.12809
Segment Growth	2.793772	1.196125	2.34	0.02	0.4473514	5.140193
_cons	-125.2051	43.32896	-2.89	0.004	-210.2029	-40.20739

To sum the results on effects of acquisition activity on financial performance, it can be concluded that intra- and inter-segment and inter-industry acquisitions have a positive effect on profit as measured by EBIT. Both a high rate

of entering new segments as well as making an inter-segment acquisition from a new segment affect profit negatively.

Figure 13 plots all observations of acquisition activity and EBIT changes. Both acquisition activity and the EBIT changes are calculated as three year averages with different types of acquisitions summed together. The dots show the median values for all acquisition levels. Two outliers are left out of the figure. The figure shows quite clearly that there is a connection between changes in EBIT and number of acquisitions. The Pearson correlation coefficient between the two is 0.41 when the outliers are included and when they are excluded it rises to 0.60 which is quite significant. This confirms the earlier findings of a connection between EBIT increases and acquisitions.

Figure 13: EBIT changes by acquisition activity
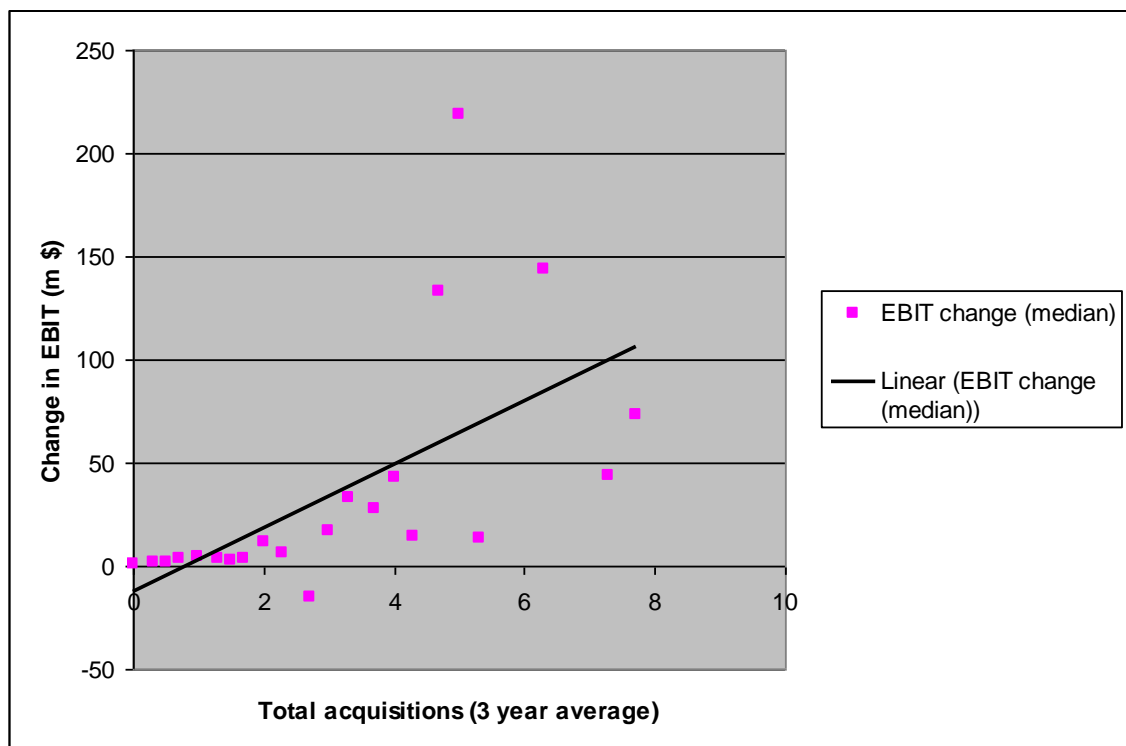
I also tested the results for reverse causality, namely that good financial performance would drive companies to undertake acquisitions. To test for this I

used a lagging EBIT as the dependent variable. Results are summed up in Table 15. The slight difference between the non-lagged coefficients in Table 13 is the result of dot-com boom as a control variable due to the incompatible timing. Still, the coefficients as well as the order of the different acquisitions remain the same for the different lags. This would suggest that reverse causality is not a direct cause for the observed effects and acquisitions may indeed be a cause of profit instead of a symptom.

Table 15: Coefficients of independent variables for different lags in EBIT

Variable/ Lag	0	-1	-2	-3
IntraSeg	48	61	75	77
InterSeg	509	639	752	856
InterInd	92	111	138	163
Rate Of Entry	-384	-450	-462	-448

5.7 Results with ITS excluded

As shown earlier, the biggest segment Information technology services (ITS) makes up almost half of the sales and almost one third of the firms. This segment differs from the others in that it contains a variety of different firms, many of them with quite different focus. Some examples include hardware manufacturers that also supply consultancy and information management systems such as IBM and Fujitsu. Others include several technology consultancies that have a much higher marginal costs than pure software firms.

In order to test the robustness of my results, I also tested my hypotheses while excluding this segment. This reduced the sample to 1022 firms with a total of 8 635 observations. Table 16 shows the tests for hypotheses 1a-3a and 5a. The coefficients are all statistically significant and they are rather similar than with all segments included. However, the constant term is not statistically significant which suggests that the model is not completely reliable.

Table 16: Effects on EBIT with ITS excluded

Regression with Driscoll-Kraay standard errors	Number of obs	=	8635

Method: Fixed-effects regression		Number of groups	=	1022	
Group variable (i): gvkey		F(8, 1021)	=	27.5	
maximum lag: 2		Prob > F	=	0	
		Within R-squared	=	0.141	
		Drisc/Kraay			
EBIT3yr	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]
IntraSeg	57.30587	14.16318	4.05	0	29.51359	85.09815
InterSeg	550.7819	108.1534	5.09	0	338.5536	763.0102
InterInd	100.2403	36.83619	2.72	0.007	27.957	172.5236
Enter New	-423.208	59.13967	-7.16	0	-539.257	-307.158
Concentration	142.2298	56.77607	2.51	0.012	30.81864	253.6409
Market Share	677.6459	245.8557	2.76	0.006	195.2057	1160.086
Survival	-170.417	86.62684	-1.97	0.049	-340.404	-0.43033
Boom	40.27837	12.44546	3.24	0.001	15.85676	64.69998
_cons	15.32894	50.54318	0.3	0.762	-83.8514	114.5093

Table 17 shows the results of testing hypotheses 1b-5b with ITS excluded. There is a marked difference only on hypothesis 1b that was previously significant at $p<0.05$ but currently only at $p<0.1$. Other results are similar to those with all segments included.

Table 17: Effects on survival with ITS excluded

VARIABLES	(1) base	(2) h1a	(3) h2a	(4) h3a	(5) h4a	(6) h5a
Survival3yr	-3.310***	-3.278***	-3.312***	-3.306***	-3.296***	-3.264***
Acquisition activity	0.000817	0.000123	-0.00556	0.00109	-0.00749	-0.00541
Segment Growth	0.000125	0.000165	0.000516	4.80e-05	0.000626	0.000852
Concentration	0.350	0.372*	0.333	0.346	0.340	0.363*
Market Share	-1.864***	-1.902***	-2.040***	-1.843***	-1.992***	-1.935***
Boom	0.0342	0.0298	0.0351	0.0353	0.0377	0.0366
IntraSeg		0.127*				
InterSeg			0.334**		0.352**	
InterInd				-0.200		
Enter New					-0.795**	
interSeg_x_ Enter New					0.272	
Rate Of Entry						0.491**
Observations	7440	7440	7440	7440	7440	7440
Spells	7440	7440	7440	7440	7440	7440
Number of firms	997	997	997	997	997	997
Events	690	690	690	690	690	690

Chi2	86.65	89.06	92.11	87.30	93.23	95.37

The similarity of results without companies in Information technology services to those with all segments included suggests that the results can be generalized across the industry.

6 Discussion and conclusions

In this section I will present a summary of my results as well as discuss possible explanations for them. The section also includes some thoughts on the limits of the study as well as managerial and research implication for future research.

6.1 Summary of the results

This study aimed to answer the question of what kinds of acquisition strategies work best in a hypercompetitive industry. To answer the question I created five hypotheses that looked at different types of acquisitions and how they affect both survival and financial performance of focal firms. The survival of focal firms was analyzed by using Cox regression (Cox, 1972). Financial performance was analyzed by using OLS-regression models where EBIT was the dependent variable. The results of the tests are summarized in Table 18. Those cases where the p for the variable itself was greater than 0.05, are listed as only inconclusive, whereas the rest are listed according to their signs.

Table 18: Summary of the results

	Effect on survival		Effect on financial performance	
	Hypothesis	Real	Hypothesis	Real
Intra-segment acquisitions	Positive	Negative	Positive	Positive
Inter-segment acquisitions	Positive	Negative	Positive	Positive
Inter-industry acquisitions	Positive	Inconclusive	Positive	Positive
Acquisitions from known segments	Positive	Inconclusive	Positive	Positive
High entry rate	Negative	Negative	Negative	Negative

My first hypothesis concerned the effect of intra-segment acquisitions. I assumed that these would be good for both survival and financial performance as they enable the focal firm to increase its market share. However, survival of the firm is affected negatively by acquisitions made from the same segment whereas the effect on financial performance is positive.

Acquisitions from other segments within the same industry were the subject of my second hypothesis. My hypothesis stated that these would improve both the survival rate and profitability by enabling firms to diversify into new businesses. The opposite is supported by the survival model but the data from financial performance showed a positive effect.

Third hypothesis was about the effect of inter-industry acquisitions and how they might affect survival and financial performance. My assumption was that the effect would be positive on both of these. For financial performance this seems to hold but the results for survival are inconclusive. The main problem was that inter-industry acquisitions were quite rare with less than one seventh of all acquisitions. They were also quite concentrated temporarily with 215 out of 415 occurring between 1996 and 2001. Some of the effects of inter-industry activity might then simply be captured by the effects of the dot-com boom and bust.

My fourth hypothesis was related to the extent to which effect inter-segmental acquisitions was influenced by the acquirer having previous acquisition experience from the segment. My assumption that this kind of acquisitions would have more positive effect on financial performance and survival was supported in the case of financial performance but for survival the results were inconclusive.

The effect of entering new segments was also tested by the fifth hypothesis which speculated that firms that enter new segments at a high rate would have both lower survival and weaker financial performance. This hypothesis was supported by data on both counts.

6.2 Analysis of the results

There is quite a contradiction between the two columns in Table 18. On survival, the results suggest that acquisitions in general are harmful as three of the five independent variables had negative effect on survival. For financial performance the effect is broadly positive with both inter-segment and inter-

industry acquisitions having clearly positive effect on profits.

The results clearly contradict the prediction of complexity theory that firms could improve their survival prospects in a dynamic industry by engaging in active local search and exploration (Levinthal, 1997). Both local search in the focal firm's original segment and exploration into other segments lead to a decrease in survival rate. Instead of making firms fitter, they increase the risk of becoming acquired or going bankrupt. This may be because of overstretching in firm's integration resources and a failure to develop the key learnings from earlier acquisitions.

Earlier research has shown that acquisitions are linked to performance with a U-curve (Laamanen & Keil, 2008). Although there was no such finding in this study, it might be that there exists an optimum amount of acquisitions from the perspective of survival.

Research on acquisition performance has found both that related diversification creates more value than unrelated diversification (Anand & Singh, 1997; Rheaume, 2008; Singh & Montgomery, 1987) and that the opposite holds (Lubatkin, 1987; Seth, 1990). In those studies where the focus has been on other measures than the stock price the results are that consolidation oriented acquisitions and acquisitions based on strategic fit fare better than the rest (Anand & Singh, 1997; Hopkins, 1987a). In this study intra-, inter-segment and inter-industry acquisitions all increased profit, with inter-segment acquisitions having the greatest effect. However, acquisitions from totally new segments and a high rate of entry into new segments had a negative effect on profit.

There were big differences in effects on acquisition on survival between firms that got acquired and those that got bankrupt. Probability of becoming an acquisition target was increased by dot-com boom, high EBIT margins, intra-segment acquisitions and high rate of entry into new segments. Market share and rate of survival in the focal firm's segment reduced the possibility. For bankrupt firms the only significant effect was inter-segment acquisitions that increased the

likelihood of going bankrupt.

That high profitability should increase the chances of becoming acquired supports earlier research (Barnes, 1990). The link between intra-segment acquisitions and becoming acquired is less clear, although it could be that firms that try to consolidate their position in their focal segment become more enticing targets for acquirers from other segments.

The tendency of inter-segment acquisitions to increase chances of going bankrupt points to a strain in resources that inter-segment acquisitions from new segments bring and which was also proved by hypothesis 4a. While inter-segmental acquisitions do increase the profit of the acquirer, overreach can cause the acquirer to go bankrupt before it can reap the rewards from its actions.

There are also clear differences between acquisitions done by more profitable and more financially solvent companies and their less financially sound competitors. Companies with better financial position are negatively affected by intra-segmental acquisitions where as those in a weaker position are affected by both inter-segment acquisition and a fast rate of entry into new segments.

These differences suggest that companies with more resources are better able to build positions in new markets. Their major threat is acquiring too strong position in the focal segment which makes them a good target for new entrants planning to enter the market. Weaker companies tend to strain their resources and become victims of bankruptcy or acquisition, especially so when they enter new segments.

The results also differ depending on the time period under consideration. Software industry underwent a dramatic change during the time period under research. Dividing the data into the three subsets introduction, growth and maturity shows that during the introduction phase no variable was statistically significant. This is most likely due to the fact that exits as well as acquisitions in

that period were relatively rare.

In the growth phase of 1994-1998 inter-segmental acquisitions and entering new segments had a strong negative effect on survival. Also acquisition rate in target segment was a significant negative factor. Market share in the focal segment had a positive effect as it reduced the likelihood of becoming acquired during a period of rapid entries but also initial consolidation in many segments.

In the maturing phase 1999-2006 survival rate in the focal segment as well as market share and segment growth had a significant positive effect on survival. A high rate of entry had still negative effects, where as other independent variables had no effects. This indicates that as the number of firms started to drop the importance of focal segment increased. A segment that was still growing rapidly and where others were surviving was more likely to provide good chances of survival. However, firms that had entered new businesses too rapidly and had not been able to consolidate those positions sufficiently were in danger of becoming acquired or going bankrupt.

A possible reason for the difference between hypotheses a and b is also that there is simply survivorship bias. Firms that went bankrupt or were acquired after making acquisitions are not present in the sample when profits are calculated. So acquisitions seem to be good for firms that continue operations.

It is also possible that there is simply a misapprehension of correlation and causality. Firms make acquisitions because they are profitable and as I demonstrated, profit is highly autocorrelated. So acquisitions would not be a cause but a symptom of financial performance. This kind of causality is hard to test in general and in panel studies especially so. In this study I used lagging EBIT to test for reverse causality and found no evidence to support the assumption about its existence.

6.3 Limitations of the research

The focus of this study was the software industry. Software industry was initially chosen as an example of a hypercompetitive industry with changing competitive advantages, rapid technological change and low entry barriers. Although these characteristics are common to other hypercompetitive industries as well, the results should not be generalized to other industries without accounting for possible industry-specific characteristics such as the rapid business cycle of 1995-2003 and the constant erosion of competitive advantages.

The study was also strictly focused only on American companies and firms that were traded in US exchanges. There might be some country-specific issues such as the availability of capital for acquisitions and the state of corporate governance that would change the results in other countries.

6.4 Methodology

The use of both survival analysis and financial performance to assess the effect of acquisitions increases the reliability of results, as studying only the financial performance would lead to considerable survivorship bias and focusing only on survival would miss the performance differences between the survivors.

Studies on acquisition performance have traditionally relied on short-term cumulative abnormal stock returns (Lubatkin, 1987; Singh & Montgomery, 1987; Shelton, 1988; Seth, 1990). Use of CAR is quite dependent on the efficient market assumption that investors are able to evaluate the pros and cons of an acquisition and its future effects in relatively short time-period. The use of panel-data allows the move away from the stock-market based estimation, but by lumping all acquisitions done in year into three variables it risks missing out important differences between the acquisitions. This is especially so, concerning some control variables such as deal size and acquisition activity in target segment that are calculated as averages of several acquisitions. However, survival analysis does not

lend itself to event studies.

The idea of segmentation rests on the assumption that all firms can be placed in only one segment where they do their principal business. However, as companies expand their initial business through acquisitions it becomes increasingly difficult to say what are they about. Is Yahoo an Internet search engine or Internet platform? Where to draw the line between clicks, pure e-business companies, and bricks-and-clicks, companies that utilize e-business in their traditional operations? Especially critical is the line between software industry and other industries as more and more companies have moved such traditional tasks as processing medical transcriptions on computers. As the segmentation presented in this study was based mostly on subjective categories and personal judgment it is clear that the results must be taken with a pinch of salt. If a widely accepted, transparent, and up-to-date categorizing of software industry exists, it would be interesting to re-do this analysis to see if the results supported my conclusions.

There was also no accounting for divestments that are a relatively popular method of getting rid of poor acquisitions in software industry (Junna, 2008). Separating divested acquisitions might have changed the results and differentiated between those companies that manage to get rid of acquisitions gone wrong and those that don't.

6.5 Data

As the study included data from two different databases, there is an obvious scope for errors and mistakes in conversion and combining. Although the SDC database is supposed to hold information concerning all acquisitions, there were some glaring omissions such as the case of eBay that was listed as having made only 1 acquisition during the time period although it is documented as having made 12 of them in the United States alone (Wikipedia, 2009). This does not suggest that the entire data set is corrupted, mainly that there are some issues with its reliability.

A major problem in the study was the lack of information concerning deal sizes. It is hard to estimate the importance of the deal for the acquiring firm without knowing its size. Most of the deals where information is not available are probably smallish ones, but there still exists considerable variance between them.

6.6 Implications and further research

6.7 Managerial implications

For managers of companies in hypercompetitive industries such as software this study seems to point out the risks of engaging in acquisitions, at least without good preparation. Acquisitions seem to increase the risk of ceasing to exist, whether by acquisition or bankruptcy, and these cases have usually negative implications for the managers concerned.

This is especially true for acquisitions from new segments. The study showed that these tend to have a negative effect on financial performance. A high rate of expansion affected both survival and financial performance negatively. Good examples of this kind of acquisition sprees abounded during the dot-com era when many companies simply used their inflated stock prices to grow their businesses without considering the inherent logic of the deals.

However, acquisitions can create value for a company in a hypercompetitive industry such as the software business. This is evident from the examples of such large and successful businesses as Microsoft, IBM, Symantec and Oracle that made more than 200 acquisitions between them in the research period. The key issue is that acquisitions should be part of a well-planned strategy instead of separate actions as acquisition strategies are demonstrably more likely to create value for the shareholders (Hopkins, 1987b).

Also, initial financial position of the company matters for the success of acquisitions. Companies with higher margins and stronger balance sheets can

engage in inter-segmental acquisitions and enter new segments with less risk than their weaker competitors. So, firms should initially build a strong position in their own segment before entering new businesses. However, the results suggest that building a position in focal segment is better done organically, as intra-segment acquisitions increase the risk of financially strong companies becoming acquired. Intra-segment acquisitions are also financially less profitable than inter-segment ones.

The results suggest that after the initial entry, acquisitions from other segments can help companies to increase profits and create multiple positions of strength. These in turn help companies to survive as multi-market presence improves survival rate (Laamanen & Keil, unpublished).

Acquisitions can be used to create and strengthen stronghold positions in new markets. However, they seem to be an inferior method of growing market share in original business.

Managers also must identify which part of the industry lifecycle are they currently in. As the results indicate there is an especially clear difference between the growth and the maturing phases with the former being less suitable time for entering new segments by acquisition.

6.8 Research implications

This study is part of the research into acquisition strategies and performance of acquisitions. The field is by no means new, as shown in the literature review section. However, most of the field is focused on single acquisitions, although serial acquisitions and acquisition strategies are often an integral part of corporate strategy (Laamanen & Keil, 2008).

Most of the research has also been focused on how acquisitions affect stock prices with minority of studies looking at other financial indicators. From my study it is clear that acquisitions also have a significant effect on company survival. It

would be interesting to take this study further in order to find out what factors are most influential for survival when undertaking acquisition strategies.

Considering acquisition performance, there are many conflicting studies on the relative benefits of diversification versus consolidation. My study supports the views of Singh & Montgomery (1987) and Shelton (1988), in that acquisitions from other segments of the industry or other industries have positive effect on profit. These sorts of acquisitions can be classified as related diversification.

From the point of complexity theory the picture is a bit more muddled. Both intra-segment acquisitions, the kind of that mostly resemble local search, and inter-segment acquisitions, more like exploration or random search, seem to have negative effect on survival. The effect is especially stark for companies that enter new segments at a rapid rate. These companies are constantly trying to jump to new locations without establishing themselves in any particular place. However, some successful companies such as Microsoft have a long history of entering new businesses by acquisitions. Future research could also establish the factors that separate successful expansionists that succeed in creating new businesses from those who fail to strengthen their existing business or to create new revenue streams. My results suggest that financial strength is an important determinant in acquisition success but exact measures and the effect of organizational and managerial factors is still undetermined.

I have to admit that my results seem to create more questions than they give answers to. The biggest of these new questions concerns the difference between effects on financial performance and survival. I assumed this to be due to survivorship bias and differences in the financial position of the acquirers, but it would be interesting to replicate this study in other industries to see if these results can be replicated.

7 References

Agarwal, R., Sarkar, M., & Echamebadi, R. 2002, "The conditioning effect of time on firm survival: An industry life cycle approach." *Academy of Management Journal*, vol. 45, no. 5, pp: 971-994.

Anand, J. & Singh, H. 1997. "Asset redeployment, acquisitions and corporate strategy in declining industries", *Strategic Management Journal,* vol. 18, pp. 99-118.

Bain, J.S. 1959, *Industrial Organization*, New York: Wiley.

Bane, W.T. & Neubauer, F. 1981, "Diversification and the Failure of New Foreign Activities", *Strategic Management Journal*, vol. 2, no. 3, pp. 219-233.

Barnes, P. 1990, "The Prediction of Takeover Targets in the U.K. by Means of Multiple Discriminant Analysis", *Journal of Business Finance & Accounting*, vol. 17, no. 1, pp. 73-84.

Barney JB. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, vol. 17, pp: 99-120.

Barney, J.B. 2007 (3rd ed.). *Gaining and sustaining competitive advantage*, New Jersey: Pearson

Blossfeld, H.-P. & Rohwer, G. 1995. *Techniques of Event History Modeling: New Approaches to Causal Analysis*. Mahwah, NJ: Lawrence Erlbaum.

Bower, J.L. 2001, "Not all M&As are alike - and that matters", *Harvard business review,* vol. 79, no. 3, pp. 92-+.

Callahan, G. & Garrison, R. 2003. "Does Austrian business cycle theory help explain the dot-com boom and bust?". *Quarterly Journal of Austrian Economics*, vol. 6, no. 2, pp. 67-98.

Caves, R.E.,1980, "Industrial organization, corporate strategy and structure", *Journal of Economic Literature*, vol. 58, pp. 64-92.

Cox, D. R. 1972. "Regression models and life tables". *Journal of the Royal Statistical Society*, Series B, vol. 34, pp. 187–220.

Cox, D. R. & Oakes, D. 1984. *Analysis of survival data*. London: Chapman and Hall.

Craig, T. 1996, "The Japanese beer wars: Initiating and responding to hypercompetition in new product development", *Organization Science,* vol. 7, no. 3, pp. 302-321.

Das, S. & Zhang, H. 2003, "Rounding-up in reported EPS, behavioral thresholds, and earnings management", *Journal of Accounting and Economics*, vol. 35, no. 1, pp. 31-50.

D'Aveni, R. A. 1994, *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*, New York: Macmillan.

D'Aveni, R. 1995, "Coping with hypercompetition: Utilizing the new 7S's framework", *Academy of Management Executive*, vol. 9, no. 3, pp. 45-60.

D'Aveni, R.A. 1999, "Strategic supremacy through disruption and dominance", *Sloan management review,* vol. 40, no. 3, pp. 127-+.

Dobrev, S. D. & Carroll, G. R. 2003, "Size (and competition) among organizations: Modeling scale-based selection among automobile producers in four major countries, 1885-1981.", *Strategic Management Journal*, vol. 24, no. 6, pp: 541-558.

Driscoll, J.C. & Kraay, A.C. 1998, "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data", *Review of Economics & Statistics*, vol. 80, no. 4, pp. 549-560.

Eggers, J.P. & Siggelkow, N. *"Performance and Survival Implications of Exploration and Diversification"*, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.104.1251&rep=rep1&type=pdf (accessed 2.9.2009)

Ferrier, W.J., Smith, K.G. & Grimm, C.M. 1999, "The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers", *Academy of Management Journal,* vol. 42, no. 4, pp. 372-388.

Finkelstein, S. 1997, "Interindustry merger patterns and resource dependence: A replication and extension of Pfeffer (1972)", *Strategic Management Journal,* vol. 18, no. 10, pp. 787-810.

Finney, R.Z., Campbell, N.D. & Powell, C.M. 2005, "Strategies and resources: Pathways to success?", *Journal of Business Research,* vol. 58, no. 12, pp. 1721-1729.

Gavetti, G. & Levinthal, D. 2000, "Looking forward and looking backward: Cognitive and experiential search", *Administrative Science Quarterly*, vol. 45, no. 1, pp. 113-137.

Gimeno, J. & Woo, C.Y. 1996, "Hypercompetition in a multimarket environment: The role of strategic similarity and multimarket contact in competitive de-escalation", *Organization Science,* vol. 7, no. 3, pp. 322-341.

Greene, W.H. 2000, *Econometric Analysis,* 4th ed. New Jersey: Prentice Hall.

Haleblian J, Finkelstein S. 1999, "The influence of organizational acquisition experience."

Administrative Science Quarterly, vol. 44, pp. 29-56.

Haleblian, J.J., Kim, J.Y.J. & Rajagopalan, N. 2006, "The influence of acquisition experience and performance on acquisition behavior: Evidence from the US commercial banking industry", *Academy of Management Journal,* vol. 49, no. 2, pp. 357-370.

Hall, M. & Weiss, L. 1967, "Firm Size and Profitability", *The review of economics and statistics*, vol. 49, no. 3, pp. 319-331.

Harvey, M.G. & Lusch, R.F. 1995, "Expanding the nature and scope of due diligence", *Journal of Business Venturing*, vol. 10, no. 1, pp. 5-21.

Hayward, M.L.A. 2002, "When do firms learn from their acquisition experience? Evidence from 1990-1995", *Strategic Management Journal,* vol. 23, no. 1, pp. 21-39.

Hopkins, H.D. 1987, "Acquisition Strategy and the Market Position of Acquiring Firms", *Strategic Management Journal,* vol. 8, no. 6, pp. 535-547.

Hopkins, H.D. 1987, "Long-Term Acquisition Strategies in the United-States-Economy", *Journal of Management,* vol. 13, no. 3, pp. 557-572.

Jarrell, G.A. & Poulsen, A.B. 1989, "The Returns to Acquiring Firms in Tender Offers: Evidence from Three Decades", *Financial Management*, vol. 18, no. 3, pp. 12.

Junna, O. 2008, *Post-acquisition performance of active acquirers of divested assets in the software industry* (Master's thesis). Helsinki University of Technology: Espoo.

Karels, G.V. & Prakash, A.J. 1987, "Multivariate Normality and Forecasting of Business Bankruptcy", *Journal of Business Finance & Accounting,* vol. 14, no. 4, pp. 573-593.

Kauffman, S. A. 1993, The origins of order: Self-organization and selection in evolution, New York: Oxford University Press.

King, G. & Zeng, L. 2001, "Logistic Regression in Rare Events Data." *Political Analysis*, vol. 9, no. 2, pp. 137–63.

Knudsen, T. & Levinthal, D. A. 2007. "Two faces of search: Alternative generation and alternative evaluation", *Organization Science*, vol. 18, no. 1, pp. 39-54.

Laamanen, T. & Keil, T. 2008, "Performance of serial acquirers: toward an acquisition program perspective", *Strategic Management Journal,* vol. 29, no. 6, pp. 663-672.

Levinthal, D.A. 1997, "Adaptation on Rugged Landscapes", *Management Science,* vol. 43, no. 7, pp. 934-950.

Levinthal, D.A. & Warglien, M. 1999, "Landscape design: Designing for local action in complex

worlds", *Organization Science*, vol. 10, no. 3, pp. 342-357.

Li, S.X. & Greenwood, R. 2004. The effect of within-industry diversification on firm performance: synergy creation, multi-market contact and market structuration. *Strategic Management Journal*, vol. 25, no. 12, pp: 1131-1153.

Lubatkin, M. 1987, "Merger Strategies and Stockholder Value", *Strategic Management Journal,* vol. 8, no. 1, pp. 39-53.

Makadok, R. 1998, "Can first-mover and early-mover advantages be sustained in an industry with low barriers to entry", *Strategic Management Journal,* vol. 19, no. 7, pp. 683-696.

March, J., Simon, H. & Guetzkow, H. 1993 (2nd ed.) *Organizations*, New York: Wiley.

Mason, E.S. 1939, "Price and Production Policies of Large-Scale Enterprise", The American Economic Review, vol. 29, no. 1, *Supplement, Papers and Proceedings of the Fifty-first Annual Meeting of the American Economic Association*, pp. 61-74.

Mata, J., Portugal, P., & Guimaraes, P. 1995. "The survival of new plants: Start-up conditions and post-entry evolution", *International Journal of Industrial Organization*, vol. 13, no. 4, pp. 459-481.

Matsusaka, J.G. 2001, "Corporate Diversification, Value Maximization, and Organizational Capabilities", *The Journal of Business*, vol. 74, no. 3, pp. 409-431.

McNamara, G., Vaaler, P.M. & Devers, C. 2003, "Same as it ever was: The search for evidence of increasing hypercompetition", *Strategic Management Journal,* vol. 24, no. 3, pp. 261-278.

Mintzberg, H. 1990, "The Design School: Reconsidering the Basic Premises of Strategic Management", *Strategic Management Journal,* vol. 11, no. 3, pp. 171-195.

Mintzberg, H. 1994, "The Fall and Rise of Strategic Planning", *Harvard business review*, vol. 72, no. 1, pp. 107-114.

Montgomery, C.A. & Wilson, V.A. 1986, "Mergers That Last: A Predictable Pattern?", *Strategic Management Journal,* vol. 7, no. 1, pp. 91-96.

Nath, D. & Newell, S.E. 1998, "Organizational responses to a hypercompetitive environment: A case study of Pepsi Canada", *Journal of Business Research,* vol. 41, no. 1, pp. 41-48.

Nault, B.R. & Vandenbosch, M.B. 1996, "Eating your own lunch: Protection through preemption", *Organization Science,* vol. 7, no. 3, pp. 342-358.

Nelson, R. & Winter, S. 1982. *An Evolutionary Theory of the Firm*, Cambridge, MA: Harvard

University Press.

Oberg, C. & Holtstrom, J. 2006, "Are mergers and acquisitions contagious?", *Journal of Business Research,* vol. 59, no. 12, pp. 1267-1275.

Palich L.E., Cardinal L.B. & Miller C.C. 2000. "Curvilinearity in the diversification–performance linkage: an examination of over three decades of research." *Strategic Management Journal,* vol. 21, no. 2, pp: 155–174.

Penrose, E.G. 1959. *The Theory of the Growth of the Firm*, New York: Wiley.

Porter, M. 1980, *Competitive Strategy*, New York: Free Press.

Rheaume, L. & Bhabra, H.S. 2008, "Value creation in information-based industries through convergence: A study of US mergers and acquisitions between 1993 and 2005", *Information & Management,* vol. 45, no. 5, pp. 304-311.

Rhodes-Kropf, M. & Viswanathan, S. 2004, "Market Valuation and Merger Waves", *Journal of Finance*, vol. 59, no. 6, pp. 2685-2718.

Rindova, V.P. & Kotha, S. 2001, "Continuous "morphing": Competing through dynamic capabilities, form, and function", *Academy of Management Journal,* vol. 44, no. 6, pp. 1263-1280.

Salo, O. 2006. *Acquisition and divestment program performance of serial acquirers* (Master's thesis). Helsinki University of Technology: Espoo.

Schoenberg R. 2003. *Mergers and acquisitions: Motives, value creation, and implementation*. Oxford University Press: Oxford.

Schumpeter, J. A. 1942, *Capitalism, Socialism, and Democracy*, Harper & Row: New York.

Sebrek, S.S. 2008, *Intra-industry diversification via option lens: Technological investments in the security software industry, 1989-2003*, DRUID-DIME Academy Winter 2008 PhD Conference, http://www2.druid.dk/conferences/viewpaper.php?id=2098&cf=28 (accessed 9.2.2009)

Selsky, J.W., Goes, J. & Baburoglu, O.N. 2007, "Contrasting perspectives of strategy making: Applications in 'Hyper' environments", *Organization Studies,* vol. 28, no. 1, pp. 71-94.

Sengupta, J.K. 2002, "Model of hypercompetition", *International Journal of Systems Science,* vol. 33, no. 8, pp. 669-675.

Seth, A. 1990, "Value Creation in Acquisitions: A Re-Examination of Performance Issues", *Strategic Management Journal,* vol. 11, no. 2, pp. 99-115.

Shane, S. & Foo, M. D. 1999. "New firm survival: Institutional explanations for new franchisor mortality", *Management Science*, vol. 45, no. 2, pp. 142-159.

Shelton, L.M. 1988, "Strategic Business Fits and Corporate Acquisition - Empirical-Evidence", *Strategic Management Journal,* vol. 9, no. 3, pp. 279-287.

Siggelkow, N. 2003, "Why Focus? A Study Of Intra-Industry Focus Effects", *Journal of Industrial Economics*, vol. 51, no. 2, pp. 121-150.

Siggelkow, N. & Levinthal, D.A. 2003, "Temporarily divide to conquer: Centralized, decentralized, and reintegrated organizational approaches to exploration and adaptation", *Organization Science*, vol. 14, no. 6, pp. 650-669.

Siggelkow, N. & Levinthal, D. A. 2005. "Escaping real (non-benign) competency traps: linking the dynamics of organizational structure to the dynamics of search", *Strategic Organization*, vol. 3, no. 1, pp. 85-115.

Siggelkow, N. & Rivkin, J.W., 2007, *"Coupled Search Processes: Why is it so Difficult to Find that Organizational Design Matters?".* Strategy Unit Working Paper No. 07-106. Available at SSRN: http://ssrn.com/abstract=1001704

Singh, H. & Montgomery, C.A. 1987, "Corporate Acquisition Strategies and Economic-Performance", *Strategic Management Journal,* vol. 8, no. 4, pp. 377-386.

Smith, J. M., *Evolutionary Genetics*, New York: Oxford University Press, 1989.

Stinchcombe, A.. 1965, "*Social Structure and Organizations,*" in J. March (Ed.), Handbook of Organizations, Chicago, IL: Rand McNally.

Suarez, F. F. & Utterback, J. M. 1995, "Dominant Designs and the Survival of Firms". *Strategic Management Journal*, vol. 16, no. 6, pp: 415-430.

Swaminathan, V., Murshed, F. & Hulland, J. 2008, "Value creation following merger and acquisition announcements: The role of strategic emphasis alignment", *Journal of Marketing Research,* vol. 45, no. 1, pp. 33-47.

Thomas, L.G. 1996, "The two faces of competition: Dynamic resourcefulness and the hypercompetitive shift", *Organization Science,* vol. 7, no. 3, pp. 221-242.

Trautwein F. 1990. "Merger motives and merger prescriptions." *Strategic Management Journal*, vol. 11, pp. 283-295.

Uhlenbruck K., Hitt M.A., &Semadeni M. 2006. "Market value effects of acquisitions involving Internet firms: A resource-based analysis", *Strategic Management Journal* vol. 27, pp. 899-913.

Volberda, H.W. 1996, "Toward the flexible form: How to remain vital in hypercompetitive environments", *Organization Science,* vol. 7, no. 4, pp. 359-374.

Wernerfelt, B. 1984, "A Resource-Based View of the Firm", *Strategic Management Journal,* vol. 5, no. 2, pp. 171-180.

Wiggins, R.R. & Ruefli, T.W. 2005, "Schumpeter's ghost: Is hypercompetition making the best of times shorter?", *Strategic Management Journal,* vol. 26, no. 10, pp. 887-911.

Wikipedia contributors, "List of acquisitions by ebay," *Wikipedia, The Free Encyclopedia*, http://en.wikipedia.org/wiki/List_of_acquisitions_by_eBay (accessed May 5, 2009).

Wilson, E. & Bossert, W. (1971), *A Primer of Population Biology*, Sinauer Associates, Inc., Sunderland, MA.

Woolridge, J. (2002). *Econometric Analysis of Cross-Section and Panel Data*. MIT Press: Massachusetts.

Wright, S. 1931. "Evolution in Mendelian populations", *Genetics*, vol. 16, pp. 97-159.

Young, G., Smith, K.G. & Grimm, C.M. 1996, ""Austrian'' and industrial organization perspectives on firm-level competitive activity and performance", *Organization Science,* vol. 7, no. 3, pp. 243-254.

8 Appendices

Testing interdependence between market share and acquisitions

VARIABLES	(1) base	(2) h1a	(3) h1b	(4) h2a	(5) h2b	(6) h3a	(7) h3b
Survival	-0.0172	-0.00226	0.0404	-0.00959	0.0436	-0.0178	0.0236
Acquisition activity	0.00512	0.00421	0.00528	0.00325	0.000564	0.00535	0.00629
Segment Growth	-0.00463	-0.00450	-0.00294	-0.00477	-0.00281	-0.00465	-0.00276
Concentration	0.0812	0.1000	0.0864	0.0712	0.0503	0.0793	0.0617
IntraSeg		0.131**	0.125				
Market Share			-2.044***		-2.109***		-1.864***
intraSeg_x_ MarketShare			0.321				
InterSeg				0.0969	0.319**		
interSeg_x_ MarketShare					-0.0712		
InterInd						-0.119	0.107
interInd_x_ MarketShare							-2.743
Observations	10491	10491	10491	10491	10491	10491	10491
Spells	10491	10491	10491	10491	10491	10491	10491
Number of firms	1362	1362	1362	1362	1362	1362	1362
Events	958	958	958	958	958	958	958
Chi2	1.559	4.811	40.96	2.310	42.02	1.882	37.74

Cox regression for the period 1980-1993

VARIABLES	(1) base	(2) h1a	(3) h2a	(4) h3a	(5) h4a	(6) h5a
Survival	2.918	3.092	3.245	2.934	3.303	2.907
Acquisition activity	-33.85	-43.84	-1.180	-36.79	-1.022	-32.90
Segment Growth	-1.009*	-0.983	-0.994*	-1.030*	-1.002*	-1.005*
Concentration	-0.275	-0.286	-0.286	-0.271	-0.276	-0.274
Market Share	0.728	0.780	0.780	0.756	0.791	0.728

EBIT margin	0.713	0.648	0.765	0.742	0.765	0.707
IntraSeg		1.505*				
InterSeg			-128.0		-127.9	
InterInd				-2.718		
interSeg_x_EnterNew					2.832	
EnterNew					-0.960	
Rate Of Entry						0.135
Observations	2397	2397	2397	2397	2397	2397
Spells	2397	2397	2397	2397	2397	2397
Number of firms	414	414	414	414	414	414
Events	65	65	65	65	65	65
Chi2	15.12	17.65	19.74	17.06	20.10	15.14

Cox regression for the period 1994-1998

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	base	h1a	h2a	h3a	h4a	h5a
Survival	0.892	0.937	0.842	0.891	1.128	1.042
Acquisition activity	0.0233**	0.0225**	0.00400	0.0233**	-0.00492	0.00119
Segment Growth	0.0199	0.0199	0.0200	0.0199	0.0203	0.0185
Concentration	0.439	0.450	0.424	0.438	0.392	0.537
Market Share	-2.505**	-2.521**	-3.475**	-2.501**	-3.469**	-2.685**
EBIT margin	0.144	0.142	0.140	0.144	0.136	0.121
IntraSeg		0.102				
InterSeg			0.719**		0.557**	
InterInd				-0.0407		
interSeg_x					0.116	
EnterNew						
Enter New					0.496**	
Rate Of Entry						1.216***
Observations	2865	2865	2865	2865	2865	2865
Spells	2865	2865	2865	2865	2865	2865
Number of firms	881	881	881	881	881	881

Events	198	198	198	198	198	198
Chi2	18.69	19.04	25.72	18.70	36.29	34.91

Cox regression for the period 1999-2006

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	base	h1a	h2a	h3a	h4a	h5a
Survival3yr	-2.997***	-2.999***	-2.960***	-2.974***	-2.866***	-2.901***
Acquisition activity	0.00552	0.00466	0.00222	0.00599	0.00627	-0.00187
Segment Growth	-0.580**	-0.583**	-0.590**	-0.580**	-0.502*	-0.554**
Concentration	0.382	0.403	0.357	0.362	0.456	0.361
Market Share	-2.075**	-2.185**	-2.434**	-2.002**	-2.603**	-2.336**
EBIT_margin	0.0250	0.0244	0.0249	0.0251	0.0257	0.0250
IntraSeg		0.131				
InterSeg			0.252		0.284*	
InterInd				-0.449		
interSeg_x_					0.347*	
EnterNew						
Enter New					-0.572**	
Rate Of Entry						0.788***
Observations	4856	4856	4856	4856	4856	4856
Spells	4856	4856	4856	4856	4856	4856
Number of firms	1052	1052	1052	1052	1052	1052
Events	382	382	382	382	382	382
Chi2	43.87	45.83	45.78	45.92	57.37	58.06